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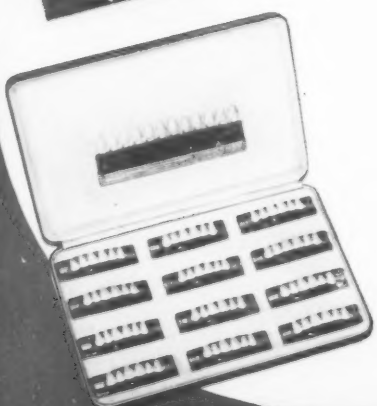

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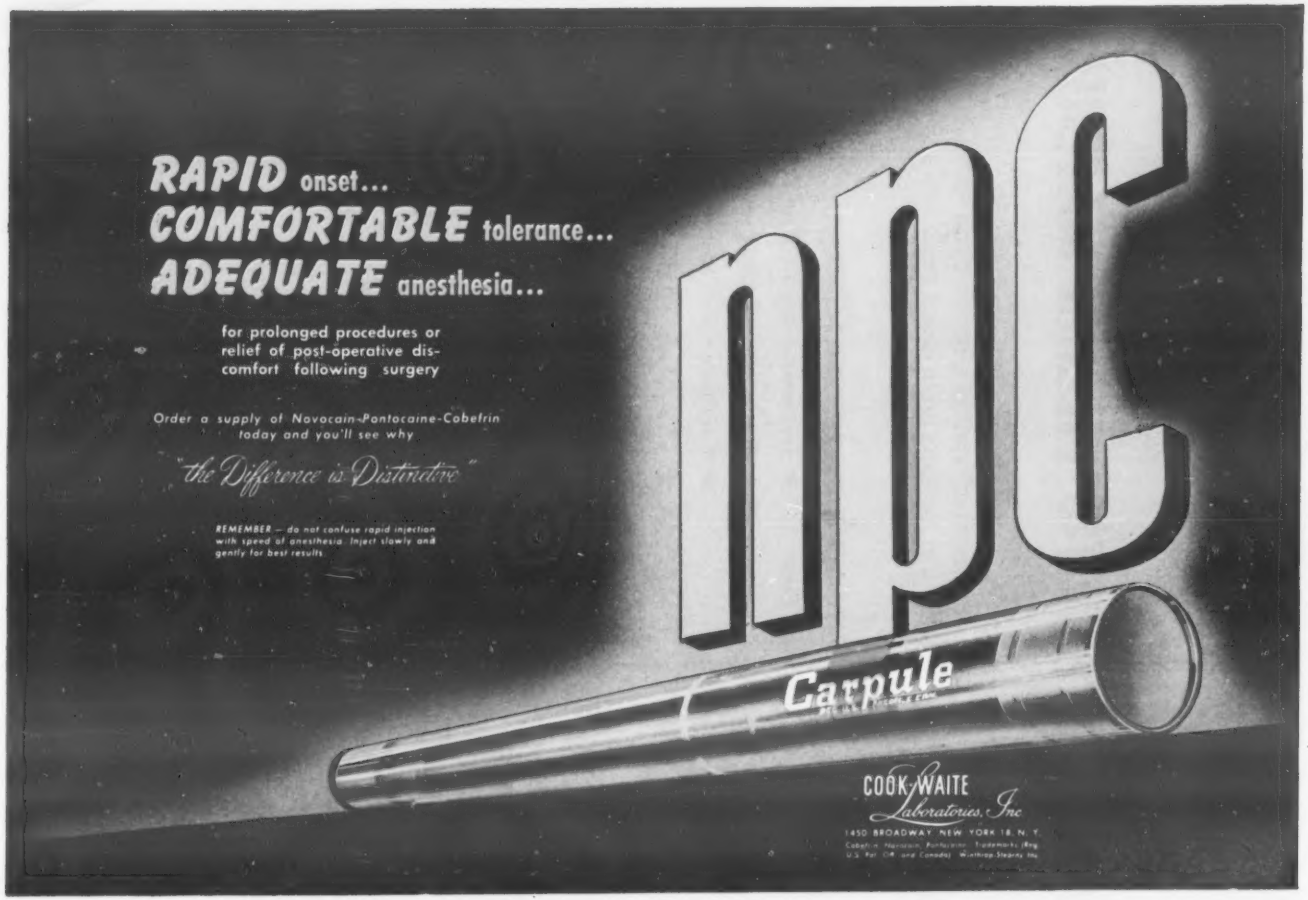
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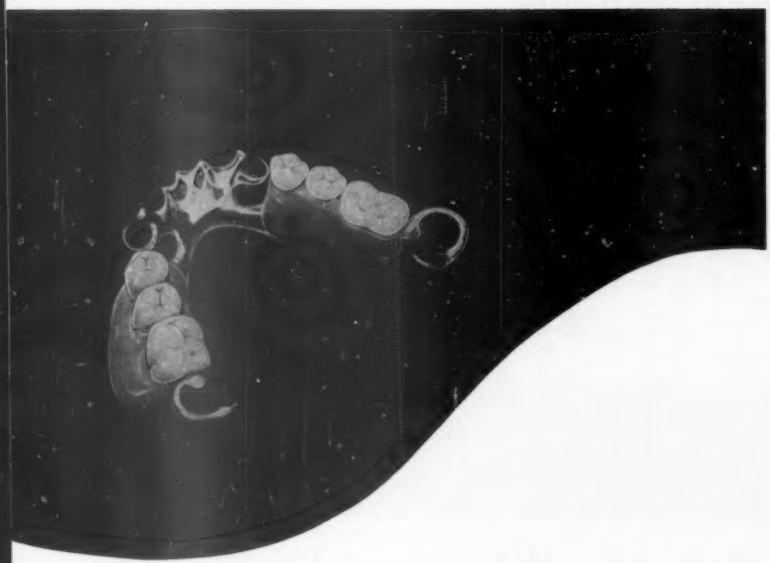

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			Alkalinity of ash, expressed as K_2CO_3	0.3 Gm.	0.3 Gm.

* Free amino acids include alanine, arginine, asparagine, cystine, serine, proline, and glutamic, aspartic and gamma-aminobutyric acids. Glutathione is also present.

1. Underwood, J. C., and Rockland, L. B.: Food Research, in press.
2. Miner Laboratories, Chicago, Illinois. (1952)
3. Davis, W. B.: Determination of Flavanones in Citrus Fruits. Anal. Chem. 19:476 (July) 1947.
4. Underwood, J. C., and Rockland, L. B.: Arch. Biochem., in press.

All others from figures taken from the literature and data compiled by Research Department, Sunkist Growers. From known tissue distribution figures, appropriate adjustments have been made to reflect the composition of the entire edible portion in those cases where the original data referred to screened juice.

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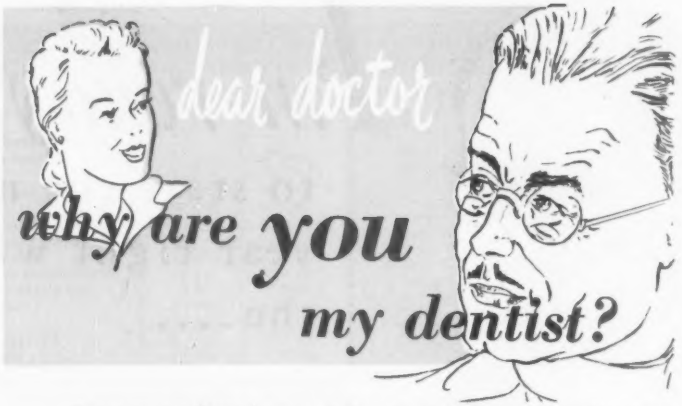

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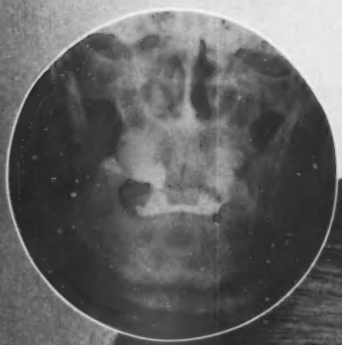

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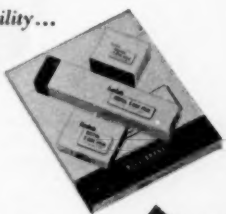

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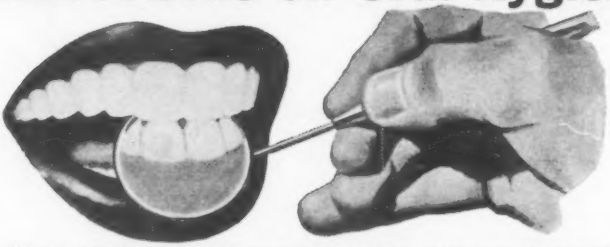

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DECEMBER 1952 VOLUME 45 • NUMBER 6

THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

Biomechanical restoration and maintenance of the permanent first molar space

A. O. Klaffenbach, D.D.S., Iowa City

The problems of permanent dentition begin prior to the eruption of the permanent first molar, which is the first tooth of the permanent dentition to erupt. Because of its key position and its influence on the alignment of the permanent teeth, on occlusion, on facial contour and on temporomandibular articulation, it has frequently been called the keystone of the dental arch. It erupts posterior to the deciduous teeth; its correct position in the permanent dentition is dependent to a great extent on the normal position and normal retention period of the deciduous teeth.

The causes for the early loss of permanent first molar teeth have often been discussed in dental literature. Preventive dentistry and research in dental caries have provided new and effective methods for lessening the incidence of dental caries, methods which will reduce greatly the early loss of these teeth. Even though an extensive dental educational program is being administered in the schools and elsewhere, there still are many parents and patients who do not realize that the permanent first molar is not a deciduous tooth; nor are they aware that when the tooth is not replaced or the space created by its loss maintained with a space maintainer during the growth and developmental period until a permanent restoration can be placed safely, a pathologic cycle is initiated which involves drifting of the teeth, occlusal disharmony, periodontal disease, collapse of dental arches and change in facial contour.

Statistical data relative to growth and development of the jaws, to eruption and premature loss of permanent teeth and to the ages at which they are lost provide a

Presented before the Section on Partial Denture Prosthesis, ninety-second annual session of the American Dental Association, Washington, D.C., October 16, 1951.

Professor emeritus of clinical crown and bridge prosthesis, State University of Iowa, College of Dentistry.

means for correlation between the spaces resulting from the loss of the permanent first molars and the treatment needed at a given age.

Brekhus[1] found that in female patients the lower permanent first molar teeth were missing in 15 per cent at 10 years of age, 35 per cent at 15, 47 per cent at 20 and 75 per cent at 40. The percentage was slightly less for male patients. A study of these data reveals that at age 20, of the 47 per cent who have lost this tooth only 30 per cent have had it replaced with a three-unit bridge because 17 per cent require a more extensive restoration on account of the loss of the second molars also. Since for about 15 per cent of the patients, first molars are missing at the tenth year and the lower second molar is not fully erupted and calcified until about the sixteenth year, some type of space maintainer must be employed until the second molar and the second bicuspid can be prepared with safety for attachments, usually not earlier than the eighteenth year of age.

When the first molar is lost before the second molar has erupted, there is a possibility that the second molar may drift mesially, become slightly tilted and eventually close the space in contact with the second bicuspid. A few cases have been seen where this had occurred with quite satisfactory results although the usual result is a mesial shifting and tipping of the second molar with faulty contact or complete lack of contact with the bicuspid, malocclusion and a triangular space or food lock.

When the permanent first molar is lost after the second molar has erupted into position, lack of preventive treatment or a delayed replacement of the first molar results in a sequel of pathologic conditions similar to that already described. A neglected first molar space (Fig. 1) permits the lower second molar to tip mesially usually with a slight lingual rotation. Since the point of axial rotation is near the bifurcation of the root, the apexes of the roots move distally. This mesial tipping of the crown of the tooth continues until only the distobuccal cusp occludes with the opposing tooth. In time the second bicuspid tips distally and loses contact with the first bicuspid tooth.

The slow continuous extrusion of the upper first molar causes loss of contact with the adjacent teeth, periodontal disturbances in this area and disruption of the curve of Spee and of occlusal harmony. Sometimes there is a shifting of the median line of the arch toward the side from which the first molar was lost. Eventually the tipping and shifting of the teeth produce loss of vertical dimension, increase the stress on the upper anterior teeth and in time cause lingual abrasion, abnormal overbite or protrusion. The loss of contact points and of functional occlusion creates a predisposition to periodontal disease, pocket formation and alveolar resorption.

In dealing with young patients, one must keep in mind that the pulps are larger than those in older patients, that a cavity of a given depth is relatively nearer the pulp because of the thinner layer of dentin over it, that the dentin is more permeable and that caries tends to bring about a premature "protective metamorphosis."[2] If the dentin has been irritated previously by decay, it becomes less permeable; hence a cast gold attachment will not harm the pulp unless the cavity is extended into the more permeable and unaffected dentin. These considerations together with the factors of growth, development, degree of calcification and time necessary to permit the abutment teeth to obtain their adult position in the dental arch are all valid reasons for delaying the placement of a

1. Brekhus, Peter J. A report on a statistical investigation on the loss of human teeth. J.A.D.A. 15:679 (April) 1928.

2. Lefkowitz, William. Effect of operative procedures on non-carious teeth of young persons. J.A.D.A. 29:1864 (Oct.) 1942.

permanent restoration and for providing a suitable space maintainer until conditions are favorable.

TREATMENT

Orthodontic Treatment • Orthodontic treatment for preadolescent and adolescent patients after extraction or loss of the permanent first molar may consist of maintaining this space and the normal position of the second molar and preventing extrusion of the opposing tooth until conditions are favorable for the placement of a permanent restoration. When the teeth have tipped because of neglect, the converging teeth can be tipped back to their correct vertical position provided that the supporting structure is stable and there is little or no bone loss or extensive pocket formation in the periodontal tissue.

A small acrylic removable appliance (Fig. 2, upper) consisting of two small segments of acrylic united with 20 gage stainless steel wire on the buccogingival

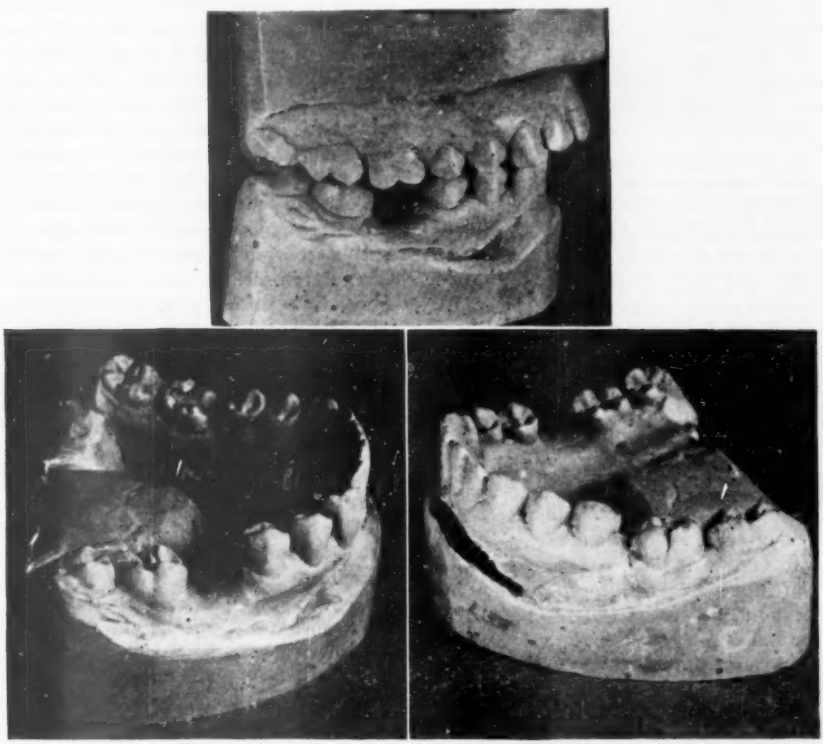

Fig. 1 • Upper: Tipping of lower second and third molars, extrusion of upper first molar, loss of contact points and protrusion of upper anterior teeth resulting from loss of lower first molar tooth. Patient aged 24. Lower left: Tipping of lower second and third molar teeth on right side of mandible. Lower right: Extensive mesial drifting and tilting of molar teeth on left side of mandible

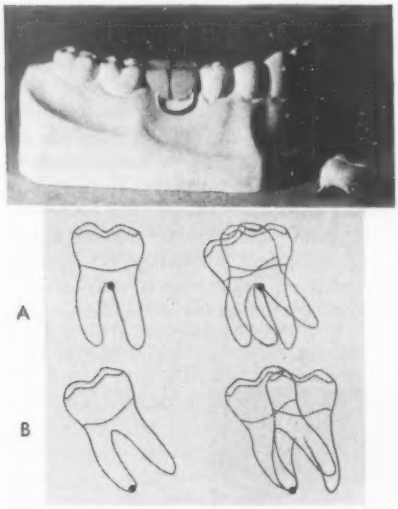

Fig. 2 • Upper: Acrylic appliance activated with stainless steel wire, sometimes used for producing mesial and distal stress in first molar space. Lower: A, dot indicates actual point of rotation when lower second molar tips mesially and apexes of roots distally. B, dot indicates point of rotation if crown of lower second molar is brought to a vertical position with stress exerted at mesial side of crown of tooth. Tooth will be distal to its normal position

and linguogingival margins can be placed in the space to produce mesial and distal pressure for raising the second molar to its vertical position and for restoring the mesial contact of the second bicuspid. This type of appliance should not be used for children because of the danger that it may be swallowed. Since the fulcrum of the tipped tooth is not at the mesiocervical margin of the alveolus but is situated near the center of the bifurcation of the root of this tooth, when pressure is applied at the mesioocclusal area of the crown of the tooth, the tooth is moved to a vertical position distal to its original position. In order to position the second molar correctly, force must be applied to rotate the tooth around this fulcrum at the bifurcation and thus to position the apexes of the roots and the crown of the tooth in normal occlusion without widening the mesiodistal width of the space (Fig. 2, lower).

Higley[3] cites a specific case of a patient 14 years of age whose four permanent first molar teeth had to be extracted because of their extremely hypoplastic and carious condition. The replacement of these teeth would have required either four fixed bridges involving eight abutment teeth, four removable bridges or two partial dentures. Because of the patient's age, space maintainers would have had to be worn approximately three years before bridge restorations could be placed with safety. When the case was diagnosed as favorable for orthodontic treatment, the patient was informed as to the time that would be required, the cost, and the necessity for full cooperation as well as the benefits to be derived from such treatment. By orthodontic means all the second molar teeth were moved mesially until they were in contact with the second cuspid teeth. The third molars were subsequently moved into position in distal contact with the second molars. Although the occlusion obtained was not ideal, it did eliminate the placement of bridges or partial dentures and the need for space maintainers.

Orthodontic movement of the second molar mesially to contact the second bicuspid has been successfully accomplished; but it is not generally considered practical because of the time required, the cost, the inconvenience to the patient and the necessity of wearing retainers after the second and third molars have been moved to the desired positions. Furthermore, the occlusal relationship is not ideal because of the difference in size and form of the second and the first molars. There are, however,

3. Brauer, J. C., and others: Dentistry for children, ed. 2. Philadelphia, Blakiston Co., 1947, p. 77, 137.

cases where by means of orthodontic treatment the tipped teeth can be placed in their correct position and the space restored to normal size.

Removable Bridge • A removable bridge is desirable only under the following conditions: if the abutment teeth are not sufficiently developed to allow for preparing adequate cavities for cast gold attachments; if the teeth are free from caries; if from a careful survey of the master cast it is found that adequate clasp retention can be obtained; if functional occlusion can be restored without the use of cast gold occlusal restorations on tilted abutment teeth; and finally if further drifting of the clasped teeth can be avoided.

The efficiency of a removable bridge depends on the correct application of this type of restoration. Violation of biological laws must be avoided. Each case presents different problems which must be recognized and solved. Simplicity of design and of construction is the chief consideration from a mechanical standpoint. Correct design requires a careful study of the mouth conditions, especially the conditions of the periodontium and the position, inclination and occlusal relationship of the teeth. Adequate occlusal rests, properly prepared occlusal rest seats and correctly designed clasp retainers with reciprocal bearings as well as accuracy of adaptation and of functional occlusion are of paramount importance. Correct design demands a careful survey of the case, roentgenograms and study casts, all made with an awareness of the three destructive factors: caries, traumatic occlusion and diseases of the periodontium.

The chief objections to unilateral short span removable bridges are the possibilities of caries under the clasps, the inconvenience to the patient, especially when two or more are used in the same mouth, destructive stress due to poor design and construction and the temptation to recommend this type of restoration because of the "chair time" saved by relegating the designing and construction to the laboratory.

Movable-removable Bridge • The movable-removable bridge with precision attachments, although rather limited in its application, may be used to advantage when conditions are favorable. The theory of the functioning of this type of restoration is based on the assumption that "teeth move in function"; consequently, to meet this requirement the restoration must permit functional movement of the attachments and of the abutment teeth and must provide adequate retention to prevent displacement in service. Its usefulness is limited to cases where the abutment teeth are in favorable alignment so that the attachments may be placed parallel to the path of insertion. Short teeth are not suitable for attachments because of insufficient length to obtain the needed frictional retention. When the teeth are sound, the question as to whether they have sufficient depth for placing attachments within the circumference of the teeth must be considered carefully. For reasons that are self-evident it is advisable not to allow more than two one-molar replacements. By means of precision attachments, decalcification and caries under the clasp arms of a clasp retainer are avoided. When a restoration of this type is properly designed and constructed, health of the periodontal tissues is assured by functional occlusion and by proper saddle pressure on the ridge tissues and abutment teeth.

Fixed and Semifixed Bridge • Efficient treatment requires careful discrimination in the selection of the type of restoration for cases requiring the replacement of a lost permanent first molar, especially if restoration of the space has been neglected and extrusion of the adjacent teeth has taken place. At best it is a choice of

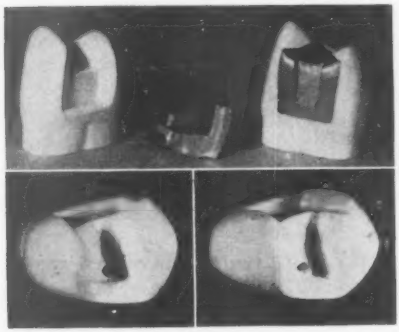

Fig. 3 • Upper: Bicuspid supporting attachment with mortise lug seat in inlay. Lower left: Preparation of bicuspid tooth showing gingival groove and pin hole. Lower right: Same with buccal and lingual channels or grooves used when gingival groove cannot be placed in sound dentin

procedures, for no restoration can fully replace the lost tooth or teeth.

When used where indicated and properly constructed, a fixed or semifixed bridge is the most satisfactory type of restoration for replacing a missing first molar tooth. It is usually more acceptable to the patient than any type of removable restoration; this is said with a full realization of the present ingenious and advanced technics in design and construction. For cases where the abutment teeth are sound and have not tipped to the extent that the occlusal surfaces require restoration to functional occlusion, there is usually no question as to the advisability of using a fixed bridge or one with a stress-breaker instead of a removable bridge. The cases with sound abutment teeth, however, are comparatively rare.

To arrive at a satisfactory decision as to the plan of treatment, an oral examination, roentgenograms, study casts and a careful diagnosis based on the available data should be a routine procedure. Both periapical and bitewing roentgenograms of the entire mouth should be studied carefully before any restorative procedure is begun. These measures are indispensable for determining the condition of the teeth and of the periodontium, for locating hidden infection and impacted teeth and for ascertaining the value of tilted teeth as abutment supports. The agar-agar and alginate impression materials have made it easy to obtain full arch impressions, from which highly accurate artificial stone casts can be obtained. These casts should be mounted on an anatomical articulator and studied to ascertain occlusal disharmonies, irregularities and the possibilities of paralleling the attachments and to determine the type of restoration indicated. They also provide a means for explaining to the patient the existing conditions and the treatment contemplated. Study casts to be shown the patient are more effective if they are made of self-curing acrylic resins in natural colors. The latter are not as accurate as those made of hydrocal, but they do provide more attractive study casts for presenting conditions and a plan of treatment to the patient.

To simplify the discussion, patients requiring lower first molar replacements have been classified into separate groups. Only typical cases have been chosen as examples for each group. The first group includes those cases in which conditions are relatively ideal. The abutment teeth are in normal position, and functional occlusion exists. These favorable conditions prevail as a result of previous orthodontic or periodontic treatment or recent extraction. The restorative treatment for these cases is comparatively simple.

Generally, a bridge with a stress-breaker may be used to advantage. If the second bicuspid is not too extensively filled or carious, a modified inlay preparation with a pin hole in the pulpal wall, a groove in the gingivoaxial angle and a mortise lug seat in the inlay (Fig. 3) may be used with a three-quarter or full crown on the second molar abutments.

The condition of the bicuspid may require the use of a more extensive attachment such as a three-quarter or a full gold crown. When the three-quarter or full gold crown is used, it is usually soldered to the pontic to form a fixed bridge.

The second group comprises those cases where the second molar and the third molar, if erupted, have drifted and tipped mesially. The second bicuspid may have drifted distally and in some instances have tipped toward the space. As the second molar and the third molar, if erupted, drift and tilt mesially, the opposing upper first molar, having lost its antagonist, tends to extrude (Fig. 1); loss of contact with the adjacent teeth may cause pathologic involvement of the periodontium.

The procedure for replacing the lower first molar when there is drifting of the second and of the third molar, if erupted, should include restoring the curve of Spee and functional occlusion, supplying the space with an efficient, hygienic pontic and correcting faulty contact points. These cases usually require some occlusal adjustment, which is obtained by grinding where necessary and by restoring the occlusal surface to conform with the occlusal plane. In order to restore the occlusal plane of the extruding upper first molar, it is necessary to shorten the molar by grinding and then to restore the occlusal surface and contact points with an onlay, three-quarter crown or full crown. If the extrusion is excessive and the tooth cannot be ground down without pulp involvement, it should be extracted and replaced with a bridge.

For this group of cases requiring pontics, a bridge with a stress-breaker or a semifixed bridge restoration with an interlocking supporting attachment is usually indicated. This type of bridge (Fig. 4) was primarily designed to permit individual movement of the abutment teeth. Its design makes it possible to use a bridge in cases where the second molar has tipped mesially without the more extensive cavity or tooth preparation that would be required if the tooth preparations were made parallel with each other instead of with the walls of the lug seat. A paralleloometer is essential for paralleling the preparations for the retaining attachment and the lug seat. Besides utilizing tipped or malposed teeth for abutments, this type can make use of a weaker tooth also for the support of one end of the bridge provided that it is used with a stronger retaining attachment on the other end. Further drifting or separation of the abutment teeth is prevented by the interlocking of the mortise lug into the T-shaped lug seat. The supporting attachment can be cemented to place separately and can be polished before the other section with the retaining attachment is cemented on the molar abutment. The dovetailed occlusal rest, the seat of which is prepared in the supporting in-

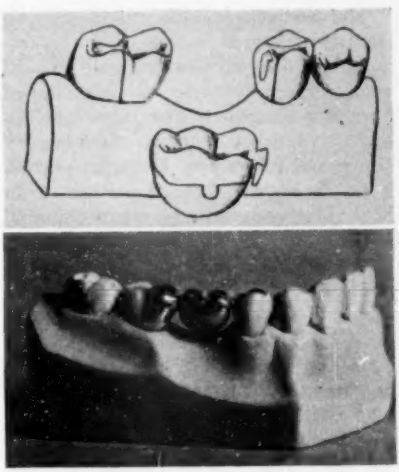

Fig. 4 • Upper: Lower bridge with modified three-quarter crown attachment on second molar, supporting attachment with lug seat on second bicuspid and "sanitary" pontic with gold occlusal and lug. Lower: Buccal view of bridge in position on abutment teeth

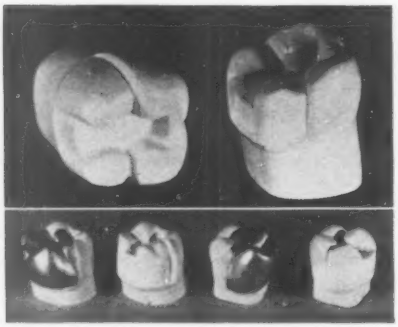

Fig. 5 • Upper: Tooth preparation for modified three-quarter crown attachment for lower second molar tooth. Lower left: Attachment in place and tooth preparation for lower molar modified three-quarter crown attachment. Lower right: Same for upper molar tooth

lay, three-quarter crown or gold crown, provides an interlocking, rigid, slightly movable joint which, if necessary, can be further locked by clinching the occlusal margins.

The modified three-quarter crown with buccal and lingual grooves (Fig. 5) is frequently indicated as a retaining attachment, especially on a mesially tipped lower second molar. The preparation is a combination of inlay, three-quarter crown and full crown. The inlay portion is similar to the occlusal portion of an MO inlay, extending along the pulpal wall to the distal pit where it is countersunk slightly or retained by a shallow pin hole. The buccal and lingual grooves should be placed as nearly as possible in the middle third of these surfaces, extending occlusogingivally. They must be carefully aligned so that they are parallel with each other and the line of placement with the other attachment or lug seat. The grooves extend over the occlusal surface and into the inlay portion of the preparation. The mesial surface is prepared so that it is parallel with the buccal and lingual grooves and the line of placement. The mesial cusps require little preparation because they are usually out of occlusion. The finishing line or chamfer is prepared so that it extends from the lingual to the buccal groove under the free margin of the gum.

For many of the tipped, extensively carious or short abutment teeth, the full cast gold crown provides the most efficient attachment. The crown of the natural tooth can be prepared parallel with the line of placement instead of with the long axis of the tooth with a resultant minimum loss of tooth structure and without injury to the pulp; the tooth form and anatomy can be modified or varied to meet occlusal requirements; the gingival margin is favorably located beneath the free margin of the gum; extensively carious or filled teeth can be restored to the required anatomic form and function. The success of the cast gold crown attachment is dependent on the preservation of the pulp of the tooth in a state of health, on the restoration of the tooth form and contour to promote function and to maintain the health of the periodontal tissues, on the retention of the crown, and on gingival contour and fit such that recurrence of caries and irritation of the gingival tissues are prevented and on close application to details in the technical procedure.

For the bicuspid attachment, where the gold crown would be esthetically objectionable, the gold crown with a porcelain or acrylic veneer may be used with good esthetic results. If the porcelain is not adequately anchored, amply protected and of sufficient thickness, however, breakage, loosening or discoloration may occur.

The acrylic-faced gold crown has to a great extent replaced the gold crown with porcelain veneer because the methyl methacrylate is not as difficult to manipulate, no expensive equipment is required and the crown can be securely anchored by processing directly into undercuts, loops or perforations provided

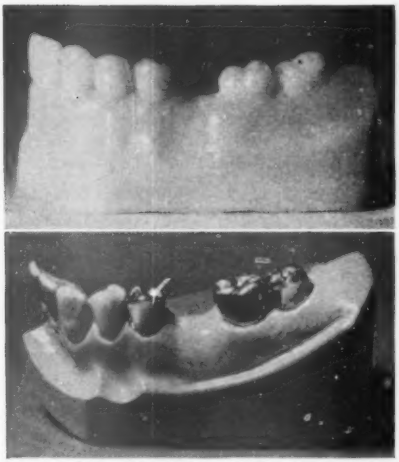

Fig. 6 • Upper: Typical case with lower second and third molars tipped mesially. Lower: Gold crown attachment on second molar, restoring occlusal surface and inlay in third molar, restoring contact and occlusal surface to occlusal plane. Three-quarter crown attachment on second bicuspid

for retention in the gold alloy crown casting. The low resistance of the acrylic resin to occlusal wear and abrasion requires that the occlusal surface, including the occlusobuccal edge and contact points, be of gold alloy. The gold casting should extend around the gingival portion including the shoulder on the buccal side to avoid having the acrylic butt against the shoulder of the tooth preparation. When translucent acrylic resin is processed directly against the gold backing in the buccal recess of the cast gold crown, a bluish-gray or gray off-color of the veneer results. If the veneer is not too thin, this off-color may be avoided by masking the gold backing with an opaque masking material or by flash gold-plating the entire crown, the procedure being varied to produce a light brassy to a deep bronze gold color of the gold alloy casting.[4]

When the third molar is present and is tilted to the extent that the distal end of the bridge cannot be seated, the interfering portion of the third molar is removed to permit seating of the bridge. After the bridge is cemented to place, the contact point and occlusal surface of the third molar are restored to the occlusal plane and to functional occlusion with an inlay or crown (Fig. 6).

A subdivision of this group includes those cases in which the second molar has drifted and tilted mesially to the extent that the remaining space is too small for a pontic (Fig. 7). The problems involved include the paralleling of the abutment tooth preparations, the restoration of functional occlusion, the prevention of further drifting and the elimination of food locks. The study cast should be surveyed carefully with a par-

4. Cohn, L. A. Acrylic-faced cast gold crown. J. Pros. Den. 1:112 (Jan.-March) 1951.

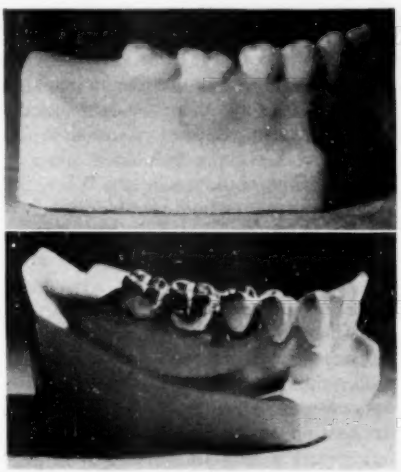

Fig. 7 • Upper: Typical case with lower second and third molars tipped mesially. Only a narrow space remains between second molar and second bicuspid. Lower: Restoration with gold crown on second molar and three-quarter crown on bicuspid. Inlay capping cusps of third molar

Fig. 8 • Left: Bridge with modified three-quarter crown retaining attachment; supporting attachment with lug; gold-acrylic pontic. Center: Bridge with full gold crown; supporting attachment with lug; all-gold "sanitary" pontic. Right: Bridge with full gold crown molar attachment; supporting attachment with lug; "sanitary" pontic with porcelain tip

allelometer to determine whether the abutment teeth can be prepared parallel with each other or whether a stress-breaking joint is necessary to provide for the seating of the two attachments in contact with each other.

The second molar is usually restored with a cast gold crown with its mesial contour built out to contact with the bicuspid. If the space is unusually wide, the distal contour of the bicuspid restoration is built out to about the center of the space to contact with the mesial contour of the molar restoration so that contact is made at about the center of the space. The two restorations are then soldered together and cemented to place as a unit on the abutment teeth. When the path of insertion would require too much loss of tooth structure for a fixed two-unit restoration, the stress-breaking mortise lug joint may be used to advantage. The lug seat can be prepared parallel with the retaining attachment so that a more favorable path of insertion may be used with a resultant saving of tooth structure. If a third molar interferes with the seating of the restoration, the interfering part is reduced sufficiently to permit the two-unit restoration to be cemented to place. The mesial and occlusal surfaces of the third molar are then restored to occlusion and mesial contact with an inlay as described earlier in this article.

PONTICS

The selection of a pontic to replace a missing tooth is dependent on good judgment and on knowledge of the different types of pontics available and of their correct application. The common types available for the first molar pontics are the facings with baked porcelain tips such as the pin-facing and the Trupontic, the "sanitary" pontic with a gold occlusal surface and a porcelain tip, the all-gold or so-called "sanitary" pontic and the gold-acrylic pontic (Fig. 8).

Because of wide variation in vertical height, mesiodistal width and shapes of ridges and spaces, each pontic must be designed ingeniously and constructed carefully to meet existing occlusal conditions and anatomic and hygienic requirements.

The gold-porcelain pontic with a spheroidal-shaped, highly glazed porcelain tip and gold occlusal and lingual surfaces is preferable in cases where space and vertical height permit its use. A type such as the "sanitary" pontic can be used for a lower bridge where a shorter pontic is required. A pontic of this type is not recommended for an upper bridge because it forms a shelf on which food collects.

When a very short pontic is required, the so-called "sanitary" all-gold pontic is often used. Unfortunately, there is a ten-

dency for a gelatinous deposit to collect on the gingival surface toward the ridge tissue unless the pontic is kept meticulously clean. It is not advisable to use a pontic of this type in cases where considerable space exists between the crest of the ridge and the gingival surface of the pontic. When this condition exists, the tip of the tongue usually explores the unnatural space and may interfere with the comfort and the speech of the patient. If such a pontic is used with a stress-breaker, the force exerted by the tip of the tongue under the pontic is sufficient to raise the lug out of the lug seat and to produce excessive movement of the retaining abutment tooth.

In some cases the bite has closed because the lower first molar teeth have not been replaced. For such adult cases when conditions are favorable, the plan of treatment should include due consideration for rehabilitation and for opening the bite. These aims can be accomplished quite readily by increasing the vertical dimension with bridges to replace the first molars and by placing onlays or inlays to cap the cusps on the first bicuspid teeth. Even though opening the bite necessitates an increase in the fee, this procedure should be given due consideration; the possibilities and benefits to be derived from such treatment should be discussed with the patient prior to proceeding with the restorative work.

There are several recognized procedures which carefully followed give satisfactory results. Although the technics may vary, the ultimate aim in each case should be to reestablish the correct freeway space, centric occlusion, centric relationship, harmony of occlusion and, as nearly as possible, normal temporomandibular articulation.

After the new vertical dimension has been determined accurately by means of check-bites, after the study casts have been remounted in their new relationship on an anatomical articulator and the necessary condyle path adjustments have been made, the temporary unilateral posterior coin silver or gold alloy splints are then cast from the wax patterns which have been carved according to the new vertical height and functional occlusion ascertained on the study cast. The splints are then polished and tried in the patient's mouth. Functional occlusion, physiologic and physical rest positions, freeway space, facial contour and speech are then checked carefully; and the necessary adjustments are made. The splints are then set temporarily with a zinc compound cement and are worn by the patient over a period of several days. If found satisfactory, they are removed and reset with crown and bridge cement. The splints are then worn again until the desired results have been accomplished and the patient is comfortable with the newly established occlusal relationship.

Finally these splints are replaced with permanent restorations. One splint is removed and the second molar and second bicuspid prepared for attachments for the bridge. At the end of each treatment before the patient is dismissed, the splint is cemented to place with zinc compound cement in order to protect the prepared teeth and to maintain the new functional occlusion. When one quadrant of the arch is completed, the restorative work on the other side is begun and brought to completion in a similar manner.

The posterior teeth should be supplied first. Occlusion must be properly adjusted before the restorations on the anterior teeth are begun. Anterior restorations such as inlays, three-quarter crowns, porcelain jacket crowns or veneer crowns may be made one at a time if desired. The type of restoration is dependent on the condition of the tooth and esthetic factors.

When all restorations have been cemented to place, a careful recheck should be made for occlusal disharmonies, phy-

siologic rest position and freeway space. The patient should be instructed to return periodically for a thorough examination and checkup.

In case of the loss of additional teeth such as the second bicuspid or the second molar, a four-unit bridge including the permanent first molar is indicated. Also included in this group are those cases requiring a unilateral or bilateral partial denture to replace lost teeth including the permanent first molar. Treatment for this group is too involved to include a discussion of it in this paper.

CONCLUSIONS

Early recognition of the need for and immediate initiation of treatment are vitally important factors in supplying lost or congenitally missing permanent first molar teeth.

The fulfillment of a health and restorative service by means of dental restorations is possible only when the biologic and physiologic factors and the mechanical procedures are correctly coordinated.

Although orthodontic movement of the second molar mesially to contact the second bicuspid for the purpose of restoring the first molar space can be accomplished successfully, it is not generally considered practical.

When used where indicated and properly constructed, a fixed or semifixed bridge is usually the most satisfactory type of restoration for supplying a missing permanent first molar tooth.

When the bite has closed because the first molar teeth have not been replaced, the plan of treatment should include due consideration for rehabilitation and for opening the bite.

Antibiotic Age • It is little more than a decade since the first patients were successfully treated with penicillin. In that decade what amounts to a revolution in medicine has taken place; we have entered an "antibiotic age." To penicillin there have been added four other antibiotic drugs of major importance. Some of the most deadly infections of mankind have been mastered, and countless lives saved. From the new drugs have come new methods of animal feeding that produce more meat at lower cost. The antibiotics have become a multimillion-dollar industry. *Kenneth B. Raper, "The Progress of Antibiotics," Scientific American 186:49 (April), 1952.*

Role of operative dentistry in the prevention of periodontal disease

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From a perusal of the older texts it can be seen that even a few years ago the term operative dentistry was far broader in scope than it is today. Gradually a number of its former subdivisions have outgrown the parent subject and have become established as independent branches of dentistry, which, in the opinion of many, surpass their source in importance and interest. In fact, it seems that some members of the dental profession feel that the ordinary filling of teeth is something to be done but not mentioned.

Many dentists are confident that they have already learned and are putting into practice every principle of importance connected with restorative procedures and that unless some new or spectacular technic is offered time is wasted in further consideration of the subject. In spite of this general attitude, it is just possible that the subject may still be of extreme importance, that operative dentistry does have a definite role to play in reducing the incidence of periodontal disease, that, indeed, tremendous benefits may accrue to the patient if the basic principles of sound operative procedure are applied.

The current definition of operative dentistry confines it chiefly to the restoration of individual teeth to health and function. Prevention, limited in this paper to its periodontal aspect, consists of three phases of treatment: (1) preoperative care, (2) operative procedures and (3) postoperative care.

PREOPERATIVE CARE

Diligent periodic observations of child and adult patients before any operative procedures are required is a prime preventive measure. Possibly the most potent weapon in the operative dentist's armamentarium at this stage is the roentgenogram. Any practitioner who does not employ this aid generally in his practice is certainly not doing justice to his patients.

From the standpoint of prevention of periodontal involvement, the roentgenogram is indispensable for observing the progress of the eruption of the deciduous and permanent dentition, for detecting carious lesions in their incipiency so that they may receive attention before contacts are open and food impactions disturb the tone and level of the septal tissues, for discovering any congenital

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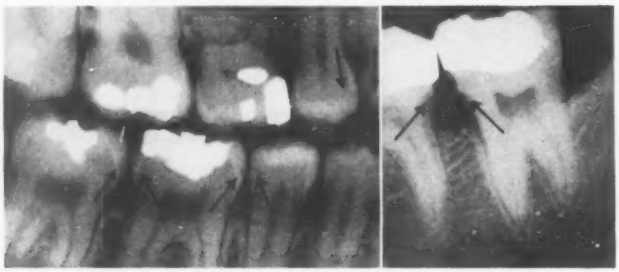

Fig. 1 • Left: Preoperative roentgenogram showing incipient interproximal caries and congenital absence of upper permanent bicuspid. Right: Spurs of subgingival calcareous deposits visible in roentgenogram

absence of teeth which would necessitate every effort being made to retain the deciduous tooth or teeth and for detecting subgingival deposits of calculus, which if not removed might cause gingivitis (Fig. 1).

OPERATIVE PROCEDURES

In his manner of operating, in the procedures and instruments he selects and in preventive technics, the operative dentist must make use of all possible preventive measures.

Manner of Operating • One of the greatest needs of the practicing dentist is a highly developed sense of compassion expressed in the diligent practice of gentleness not only toward the patient but also toward the tissues on and around which he operates. Far too many dentists are heavy-handed. In fact, there are few dentists who can honestly feel that they have never been rough on tissues, that they have always administered treatment with the utmost consideration and gentleness, that a separator has never been applied too hurriedly, a foil filling never condensed too heavily, an inlay never seated too strongly, cement never mixed and applied too rapidly, that a disk, a stone or a bur has never bruised or mutilated the soft tissues. It is possible that a little less self-esteem and a little more attention to the small details of operating would be a potent factor in reducing periodontal involvements resulting from operative procedures.

Procedures and Instruments • There are a number of procedures, especially in the use of instruments, which must be carried out carefully to prevent them from doing more harm than good. Three of the most useful and potentially harmful are the following:

1. Use of the Rubber Dam • The rubber dam is one of the most valuable adjuncts in operative dentistry. Though much has been written in support of its use, the majority of the members of the profession do not even have a piece of rubber dam in their offices. The only objections ever raised to it are those of the dentist in respect to time for application and occasionally those of the patient in respect to discomfort. These difficulties can be solved promptly and effectively if the operator will but learn one of the several speedy, comfortable, present-day technics for its use. If proper restorative service is to be performed, the rubber dam must be used routinely, not just at rare intervals. Although its improper use involves definite periodontal hazards, the proper use of the dam has many advantages in the prevention of periodontal involvements. One of its chief advantages is that a dam properly applied retracts the gingival tissues from the immediate field of

properly guided instruments, such as burs, stones, hand instruments or an air-brasive appliance, so that the necessary work can be done without impinging on, bruising or lacerating the supporting tissues.

Ill effects from improper use of the dam are equally positive and important. One of the worst procedures in using a rubber dam is the old practice of placing encircling ligatures on one or more teeth for the purpose of completing the seal or of retaining the dam in position. It has been stated explicitly many times that if the teeth under a rubber dam are dried of excess saliva, ligatures are definitely not necessary to maintain the dam in position. If any dentists are still persisting in this vicious practice, they can be sure that they are seriously jeopardizing the tone and health of the periodontal tissues.

A second grave mistake is that of trying to use stock rubber dam clamps for all occasions. Frequently a well designed stock clamp can be used without modification. Often, however, the clamp must be ground to provide more balanced contact of the clamp jaw with the tooth. To proceed without such corrective grinding simply creates a situation where the clamp jaws are scuffing and marring the surface of the cementum and probably impinging on the soft tissues. When there is movement of a clamp on a tooth, it can be arrested with a small stop of compound between the bow of the clamp and the adjacent tooth. In most instances the clamp can be removed after the dam is placed and the engaged teeth are dried. To permit an unbalanced clamp to remain on a tooth without correction and without blocking throughout the entire operation is another flagrant example of potentially harmful treatment of the periodontium.

The use of ligatures in place of clamps is sometimes advocated for rubber dam applications on deciduous teeth. Justification is based on the conical form of these teeth, on the lesser curvature in the cementoenamel line and on the difficulty of placing clamps on deciduous teeth. If two or three clamps are reduced in size and modified to fit the contours of these teeth, the application usually offers no problem and is preferable to endangering the health of the gingival soft tissues by cinching a ligature lasso around the neck of the tooth.

At times the operative dentist may find himself performing the work of the periodontist. When he is using a rubber dam during an operation, he often sees small tenacious deposits of subgingival calculus, which when hidden are difficult to detect and to eliminate but once exposed are readily removed.

When the rubber dam is removed, the interproximal strips of rubber must be carefully and completely severed. If they are carelessly removed, a fine ring or band of rubber may remain around a tooth; this rubber will work its way gingivally between the alveolar process and the tooth root; and as a result the tooth will be exfoliated.

2. Separation of Teeth • Periodontal disorders may be caused if teeth are separated injudiciously. When immediate separation is desired, a properly designed instrument which does not injure the interproximal tissues should be used judiciously. When slow separation is the method of choice, the teeth and area must not be neglected particularly if a medium such as gutta-percha is used. The separating agent should be removed as soon as the desired effect is obtained.

3. Instrumentation • It is distressing to note at times such overzealousness in the use of instruments that while the restoration itself is exceptionally well made the surrounding hard and soft tissues have been overworked. A foil filling may be so heavily condensed or an inlay so forcefully malleted to place that the fibers of the periodontal membrane are strained and the tooth is uncomfortable for a long period. A matrix

for an amalgam may be applied or withdrawn so carelessly that there is periodontal injury. Rotary tools may be used with no thought of maintaining normal water content or body temperature. Too often in connection with jacket crown preparations, an extravasation of blood occurs in the dentinal tubules so that in time the pulp becomes necrotic and a tooth is lost for want of a little time and patience with the preparations. At times the gingival finish line of full cast crown preparations is developed without the use of a rubber dam and so vigorously that the gingival tissues bleed and become shredded; on healing, they recede, leaving the gingival margin exposed. Class V foil fillings too frequently are brought to contour with excessive uncontrolled disking and filing so that the cementum is scarred, the tissue recedes and periodontal treatment often must be instituted. The result is that usually the restoration has to be replaced because of the exposed margin and the scarified cementum. In general, an operator should make an effort to be conservative in treatment and to guard against causing the patient unnecessary pain or discomfort.

Fig. 2 • Above: Amalgam filling in first molar showing marginal ridge established at a wrong level with inadequate cavity preparation and faulty margins; amalgam filling in second bicuspid showing better proximal contour and rounded marginal ridge but with no spillways over marginal ridges: foil filling in first bicuspid, excellent in other respects, does not have properly formed marginal ridge or contact point level. Below: Foil filling in upper bicuspid showing reproduction of original form of occlusal anatomy, marginal ridge and spillway

Preventive Technics • The importance of strict observance of dental morphology in restorations must not be overlooked. Restoration of proximal surfaces to correct functional form is now receiving more attention than ever, and rightly so (Fig. 2). Good proximal form, normal marginal ridge form and correct size and position of contact points can be achieved only by diligent thought and application. Too few restorations are beyond criticism in this respect. When good anatomic form is correctly restored, gingival crevices are protected from the shearing action of foods, septal tissues are protected because food is deflected from them through the spillways and stress loads are minimized on the teeth carrying either single restorations or retainers for fixed partial prosthesis.

Restorations in the gingival third of the labial or buccal surfaces should be fully contoured, perhaps even slightly in excess of normal in order to shield the labial gingival crevices from the destructive action of food scuffing down over them (Fig. 3). It is important that restorations be finished smoothly, flush with cavity margins, especially with those under the free gingival tissues. Irritations from overhanging margins are responsible for a high percentage of periodontal involvements. A few addi-

tional minutes spent in trimming and finishing restorations could eliminate most, if not all, of these breakdowns. The constant goal should be to place and finish a restoration of such marginal perfection that it is impossible with a sharp explorer to determine the line of junction of tooth and restoration.

No matter how well placed, how well contoured or carved a restoration may be, it is not complete until it has been polished. That does not mean to burn the filling, the tooth and the soft tissues with dry rubber cups run at high speed and with steady pressure; but it does mean to verify marginal finish, eliminate scratches from the surface and any irregularities in contour and then bring the surface carefully and coolly to a high polish without injury to the adjacent structures.

A final and important step before the operation is complete is that the gingival tissues in the region of the operation should be transilluminated to ensure that no excess filling material, trimmings or polish have lodged in the crevice. Here again a few minutes may make the difference between success and failure of the restoration as a saving medium for the tooth and as a protective medium for the adjacent soft tissues.

POSTOPERATIVE CARE

In addition to careful, conscientious performance of operative technics, there are a few other procedures which should be followed to complete the restoration of teeth to health and function and to maintain the health of the supporting and surrounding tissues.

First, it should be a matter of routine to check any restorative work shortly after its installation. By so doing, any occlusal disharmonies, no matter how slight, may be detected and carefully eliminated. At a subsequent checkup the condition of the gingival tissues should be observed to determine if restoration

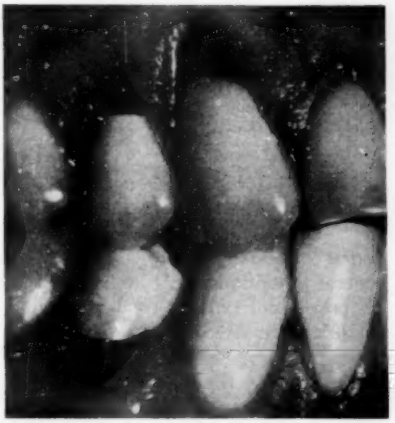

Fig. 3 • Properly contoured gingival third gold foil fillings maintaining gingival tissues under tonal tension while protecting them from scuffing action of foods

contours actually are serving as a protection as well as a stimulus for the gingival tissues.

Finally, postoperative roentgenograms should be a routine procedure (Fig. 4) to determine the success of the recontouring of previously defective surfaces, to detect any new carious lesion in its earliest stage and to spur the operator into improving the quality of his service. Increased competence in dentistry is producing much better results in operative and periodontal procedures.

SUMMARY

Periodic evaluation of achievement is essential to progress in any field. Operative dentistry has proved its value in preventing periodontal involvement. By exercising ordinary conservative care in treating dental caries, the current incidence of periodontal disease resulting from local factors can be reduced considerably.

The contributions of correct operative procedures to the prevention of perio-

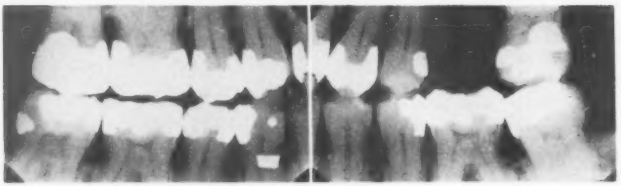

Fig. 4 • Restorations showing good proximal contours and contacts (better on upper teeth than on lower teeth) with finished gingival margins

dontal disease should convince the general practitioner that he has it within his power not only to treat periodontal conditions in his daily practice but to avoid creating additional periodontal disturbances by thoughtful application of the principles of sound operating procedure which he learned in school and which are repeated again and again throughout the literature.

The operative dentist is urged to make more general use of the rubber dam and also of preoperative and postoperative roentgenograms as aids to attain the best in restorative procedures as well as to minimize incidental periodontal pathosis. Prevention of periodontal involvements through operative procedures can be achieved most easily by combining an intelligent application of basic principles with a sincere desire for perfection and with the expenditure of sufficient energy for the careful, gentle and thorough execution of each step in the procedures.

Measuring and meeting orthodontic needs of a community

George R. Moore, D.D.S., M.S., Ann Arbor, Mich.

Today there is widespread recognition of the public need for increased orthodontic service. For the past five years orthodontic consultants have attended meetings of the advisory committee of the Children's Bureau to aid in the development of principles and standards of child care. A conference of orthodontic consultants was arranged by the Children's Bureau early in 1948; at this conference principles were formulated for public orthodontic programs for children.[1] In August, 1948, the president of the American Association of Orthodontists appointed a public health committee which served until it was replaced at the 1950 session by a standing committee on public health. The duties of this present five-man committee are "to conduct studies of the orthodontic needs of the public, to plan to meet such needs,

Presented before the Section on Orthodontics combined with the Section on Dental Public Health, ninety-second annual session of the American Dental Association, Washington, D. C., October 18, 1951.

Professor of orthodontics, School of Dentistry, University of Michigan. Died April 6, 1952.

1. Fulton, J. T. Suggested principles for public orthodontic programs for children. Am. J. Orthodont. 34:777 (Sept.) 1948.

to formulate programs for promoting orthodontic care, and to act as a liaison with other agencies interested in the promotion of programs for improvement in orthodontic care."[2] For the Midcentury White House Conference on Children and Youth, the American Association of Orthodontists published a report, "The White House Conference and Orthodontics,"[3] and a statement, "Fact Finding Report on Health Services—Orthodontics."[4]

CLASSIFICATIONS FOR SURVEY PURPOSES

The first step in any public orthodontic program is the acquisition of definite information in regard to the prevalence of irregularities of teeth and especially of malocclusion. Such knowledge can be gained only through surveys of representative population groups. Furthermore, to be usable, a survey must be based on a classification which reveals the minimum, not the maximum, need for orthodontic treatment. There is grave doubt that the Angle, Bennett or Simon classifications can be of much value since they are based on an ideal rather than a practical concept of orthodontic service.

A classification designed to measure the minimum need for adequate orthodontic service and the time required to render it was used by the author in 1945 for a survey of 7,373 school children in five Michigan towns.[5] By the use of this classification the following information was supplied for each person examined: type of malocclusion, oral habits which needed to be broken and exact orthodontic treatment indicated including type of treatment, degree of complexity and time required to render essential service.

Extensive surveys in widely separated areas of this country should be conducted for the purpose of presenting an adequate picture of the nation's orthodontic needs. When surveys are made, however, it is not enough that they be conducted according to technics that satisfy epidemiological requirements; the examiners must have in mind a clear and practical concept of dental health. Though the possibility of a united viewpoint among orthodontists such as that of dentists toward caries is remote, serious studies will aid in placing emphasis on the minimum essential treatment for maximum public service.

Once the need for orthodontic service has been estimated as accurately as possible, the next step is to meet the need. According to Henry Klein,[6] in 1946 there were only 1,351 dentists in the United States sufficiently recognized as exclusive or nonexclusive practitioners of orthodontics to earn a listing in the *Orthodontic Directory of the World.* This number now may have reached 1,500 or 1,600; but even if the number of other dentists combining relatively skilled orthodontic service with general practice should bring the total to 5,000, there would still be only one out of 15 dentists practicing orthodontics full or part time. Moreover, 3,500 part-time orthodontists probably are not equal to more than 1,000 exclusive practitioners because few of them spend more than a third of their time in orthodontic practice The United States, therefore, has the equivalent of not more than 2,500 orthodontists, that is, about one orthodontist to 30 dentists.

The teaching of clinical orthodontics should be incorporated into the curriculum of all dental schools; only in this way can a great increase in orthodontic

2. American Association of Orthodontists. Bylaws, 1950.

3. Salzmann, J. A., and Moore, G. R. White House conference and orthodontics. Am. J. Orthodont. 37:426 (June) 1951.

4. Salzmann, J. A., and others. Fact finding report on health services—orthodontics. Am. J. Orthodont. 37:50 (Jan.) 1951.

5. Moore, G. R. Orthodontic program of the Michigan State Department of Health with a new classification of occlusion for survey purposes. Am. J. Orthodont. 34:355 (April) 1948.

6. Klein, Henry. Orthodontists in the United States. Am. J. Orthodont. 34:159 (Feb.) 1948.

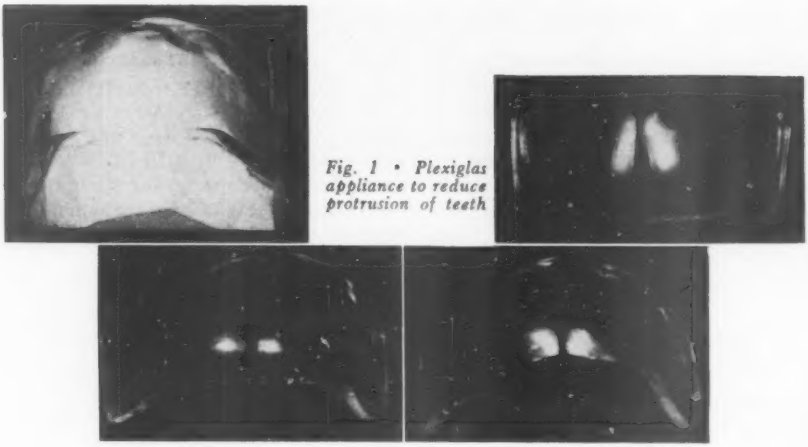

Fig. 1 • Plexiglas appliance to reduce protrusion of teeth

service be brought about. Far-reaching as the work of 2,500 orthodontists may be, the possibility of the preventive and palliative orthodontic service which could be performed by a number of dentists gradually reaching and exceeding 75,000 is impressive.

With the need of orthodontic service estimated and the number of trained orthodontists increased, the last and most important step in a public orthodontic program is the adoption of those technics which utilize the skill of the orthodontist most advantageously for maximum service to the greatest number.

COMPLEX PROCEDURES

For the treatment of complex cases, orthodontists are likely to use one of three main types of appliances: labiolingual,[7] twin-wire[8] or edgewise arch.[9] Formerly orthodontists were inclined to use one type exclusively; in recent years, however, many practitioners have come to recognize advantages in using all three separately or in combination. Most dental schools today offer training in all three types.

In Europe removable appliances of acrylic resin and stainless steel are used more widely than fixed appliances. In this country there has been a recent rise in the popularity of removable appliances. Some are patterned after the European Schwarz appliance,[10] but the most commonly used in the United States is the Crozat precious metal removable appliance.[11] Practitioners who use the Crozat appliance feel that they can handle a greater number of patients in a given time.

The Kesling rubber tooth-positioning appliance[12] is usually used as a means of forcing the teeth into more ideal cuspal relations after major tooth movements

7. Oliver, O. A.; Irish, R. E., and Wood, C. R. Labio-lingual technic: a description of labial and lingual appliances in the treatment of malocclusion. St. Louis, C. V. Mosby Co., 1940.

8. Johnson, J. E. The use of the twin-wire mechanism in the treatment of deep overbites. Am. J. Orthodont. & Oral Surg. 27:347 (July) 1941.

9. Strang, R. H. W. Text-book of orthodontia, ed. 3. Philadelphia, Lea & Febiger, 1950.

10. Schwarz, A. M. Gebisregelung mit Platten, ed. 4. Wien-Innsbruck, Urban & Schwarzenberg, 1944.

11. Crozat, G. B. Possibilities and use of removable labio-lingual spring appliances. Internat. J. Orthodont. & Oral Surg. 6:1 (Jan.) 1920.

12. Kesling, H. D. Philosophy of the tooth positioning appliance. Am. J. Orthodont. & Oral Surg. 31:297 (June) 1945.

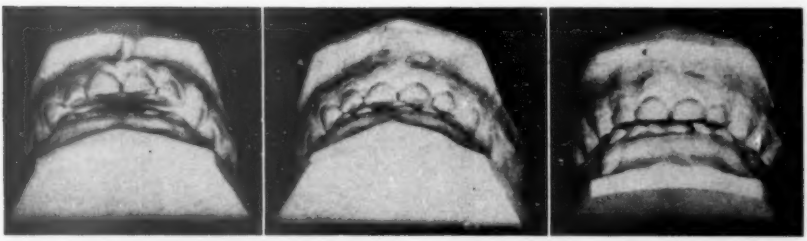

Fig. 2 • Correction of retrusion of mandibular incisors with Plexiglas shield. Patient aged five years

have been accomplished by other means. Its more extended use, beginning at earlier stages of treatment or in some cases as the only means of treatment, has been studied by only a few; it is recommended as a possible means of serving a greater number of patients. The same recommendation can be made for the Hawley and other appliances usually used only for postoperative maintenance. Their more active use as so-called "working retainers" in the latter stages of treatment is advocated as another means of increasing the number of patients that can be served in a busy practice.

SIMPLE PROCEDURES

For the handling of simple cases or the simple immediate problems of complex cases, several effective technics have been introduced. Many others will be contrived, as clinical orthodontics (based as it must be on more thorough correlation with the basic sciences) becomes a reality in teaching and practice.

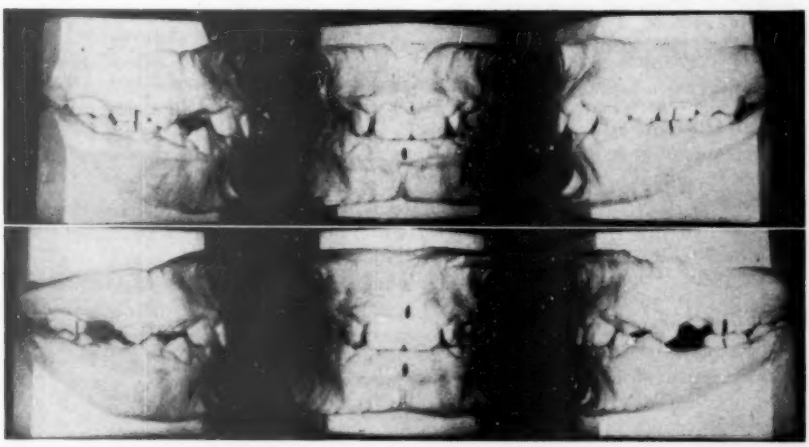

Fig. 3 • Correction of shift of mandible with band, hooks and elastic. Lower casts made two months after upper casts

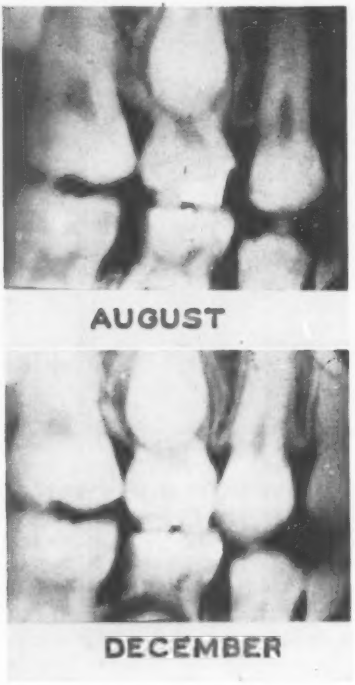

Fig. 4 • Trimming of deciduous teeth. Relation of second deciduous molars unchanged; shifting of maxillary first bicuspid and mandibular first permanent molar

Plexiglas Oral Shield • Figure 1 shows a simple appliance first cut from a flat sheet of ⅛ inch Plexiglas to a tin-foil pattern of the oral vestibule and shaped with heat to a vestibular cast on which all excessively protrusive teeth have been trimmed back. When worn in the vestibular space at night, especially when sealed in with diagonal strips of Scotch tape, the pressure of the lips against it reduces protrusion of teeth. At the same time it prevents lower lip-biting, tongue-sucking and mouth breathing.

Figure 2 shows casts of a five year old; the Plexiglas shield was shaped on an untrimmed vestibular cast because there was retrusion of the mandibular incisors but no protrusion of the maxillary teeth. Within a month the habit causing this condition was broken completely though the patient wore the shield only at night; the effect on the mandibular incisors is evident.

Elastic Traction • Figure 3 shows casts of a mouth in which the mandible had shifted to the right. The failure of the midlines of the two dental arches to coincide is readily noted. This asymmetry was caused by a cross-bite of the first permanent and second deciduous molars on the right side only. The second deciduous molars had been retained too long and their successors were present; therefore, the deciduous molars were extracted to facilitate an extremely simple plan of treatment, consisting of using one band on the upper left first permanent molar with hooks on the lingual side and another band on the lower left first permanent molar with hooks on the buccal side. An elastic from one of these hooks to another corrected the cross-bite in one month. The lower casts in Figure 3 were made two months after the upper casts; the corrected midlines indicate a shift of the mandible back to normal.

Trimming of Deciduous Teeth • Figure 4 shows an instance of the application of a principle introduced years ago by Lloyd S. Lourie.[13] In the last year or so of its term of service in the mouth, a deciduous molar may be sliced on either side or on both sides and still not shift in either direction. The author has sliced many deciduous teeth with this fact in mind, knowing that the more vital newly erupted adjacent tooth or teeth would be the only ones to shift. It can be noted in Figure 4 that in August and in De-

13. Lourie, Lloyd S. Trimming deciduous teeth to aid normal eruption of permanent teeth or assist in correction of malocclusion. Internat. J. Orthodont. & Oral Surg. 15:1070 (Nov.) 1929.

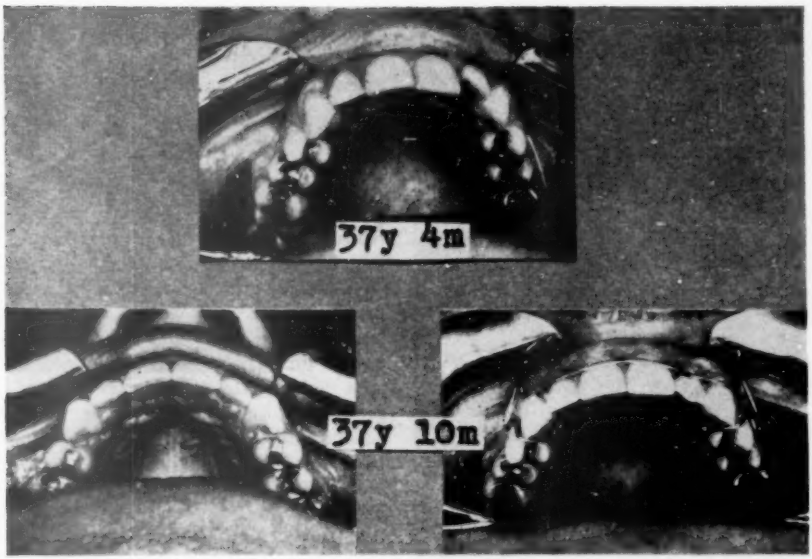

Fig. 5 • Hawley working retainer

cember the two opposing second deciduous molars were in exactly the same relation to each other; in December the maxillary first bicuspid had shifted distally into the space made by the slice and the mandibular first permanent molar had shifted mesially. Thus, by slicing a deciduous molar, minor discrepancies in anteroposterior relation can be corrected. There are other applications of this technic.

Hawley Working Retainer[14] • Figure 5 shows a working application of a remov-

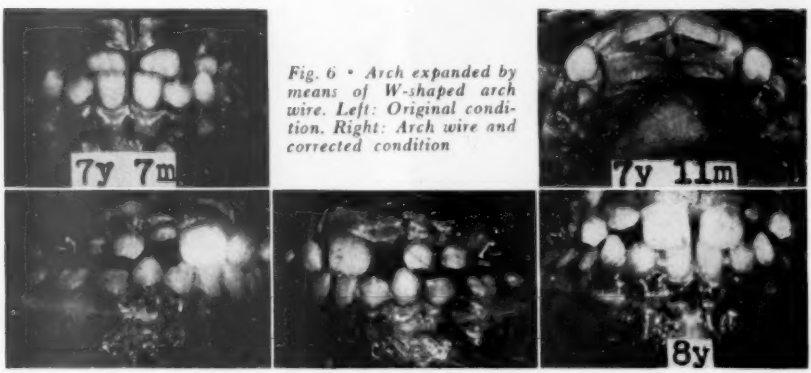

Fig. 6 • Arch expanded by means of W-shaped arch wire. Left: Original condition. Right: Arch wire and corrected condition

able appliance combining an acrylic resin palate with a precious metal or stainless steel labial section and bicuspid clasps. By trimming the acrylic resin away from the mesiolingual aspect of the upper left lateral incisor and applying the pressure of a slight bend in the wire on the mesiolabial aspect, this tooth was rotated quite easily. The same appliance was continued as a retainer, at first day and night and later nights only.

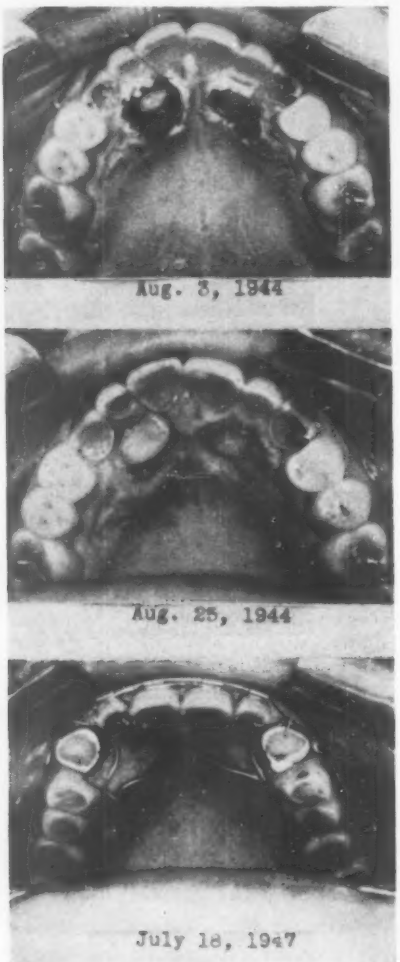

Fig. 7 • Top: Surgical exposure of unerupted cuspids. Center: Appearance of partially erupted teeth three weeks later. Below: Final alignment aided by appliance

Lingual Arch and Its Variations • There are many simple problems which can be handled if one has mastered the plain lingual wire or the modification of it shown in Figure 6. Often bilateral expansion is needed to unlock a unilateral or a bilateral cross-bite. When a cross-bite is unilateral and there is sufficient arch width, the facial asymmetry is promptly corrected by training the patient to shift the jaw. In Figure 6 the wire shown is W-shaped in accordance with a design reported by W. H. Coffin about 70 years ago when it was incorporated in a split vulcanite plate for expansion.

Surgical Exposure of Unerupted Teeth • Figure 7 shows two cuspids surgically exposed, allowed to erupt without assistance and then moved into line where final rotation occurred with the aid of an appliance. The exposure of unerupted cuspids is indicated frequently six to 12 months in advance of complex ortho-

14. Hawley, C. A. A removable retainer. Internat. J. Orthodont. & Oral Surg. 5:291 (June) 1919.

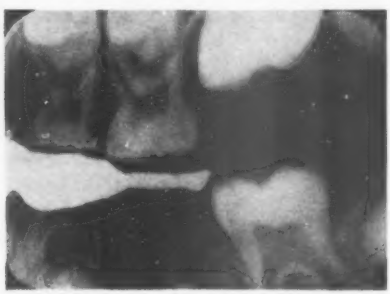

Fig. 8 • Space maintainer

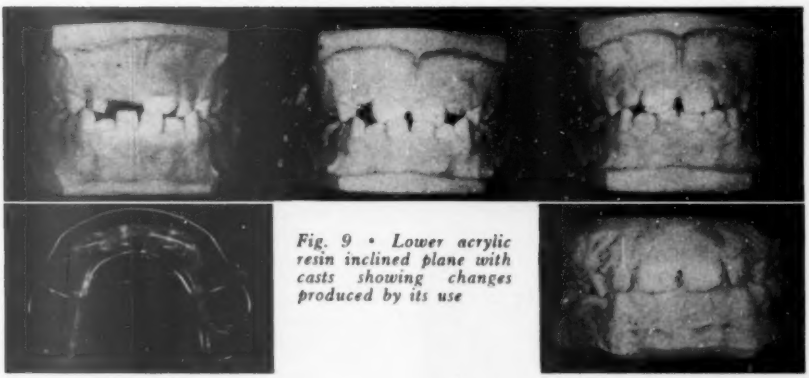

Fig. 9 • Lower acrylic resin inclined plane with casts showing changes produced by its use

dontic management. No attachment to the cuspid is necessary. A cuspid almost always erupts freely if its crown is radically denuded by surgical means and if the area is assisted surgically to heal open.

Space Maintenance • Figure 8 illustrates the principles of functional space management in a situation wherein its use is not as controversial as in many situations where space maintenance has been advocated. It is true that some dentists consider early loss of deciduous teeth as a tragic occurrence for which a space maintainer should always be administered as soon as possible. Other dentists regard loss of space after early loss of teeth, especially in certain regions of the mouth, as a possible indication for future extraction of certain permanent teeth. In fact, premature loss of deciduous cuspids is planned deliberately by some practitioners in certain instances and is gaining sanction among members of the profession. Research on this subject is indicated.

Lower Acrylic Resin Inclined Plane • Figure 9 shows a lower removable appliance simply constructed of acrylic resin and combined with clasps on the bicuspid or on the deciduous molar and a labial section. An inclined plane is built into the anterior portion. Its level is that of the incisal edges of the mandibular incisors. The casts show the result of using the appliance for a few days.

Tongue Depressor • Figure 10 shows the angle at which a wooden tongue blade or depressor is used in certain instances

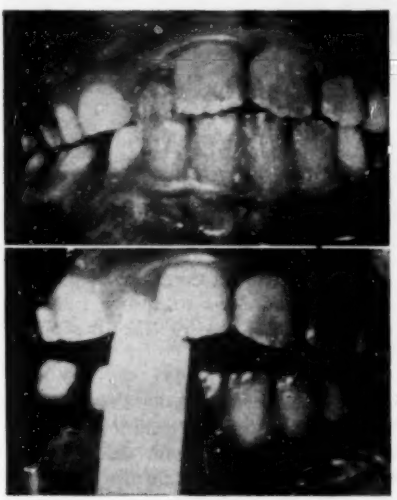

Fig. 10 • Wooden tongue blade used to unlock maxillary incisors

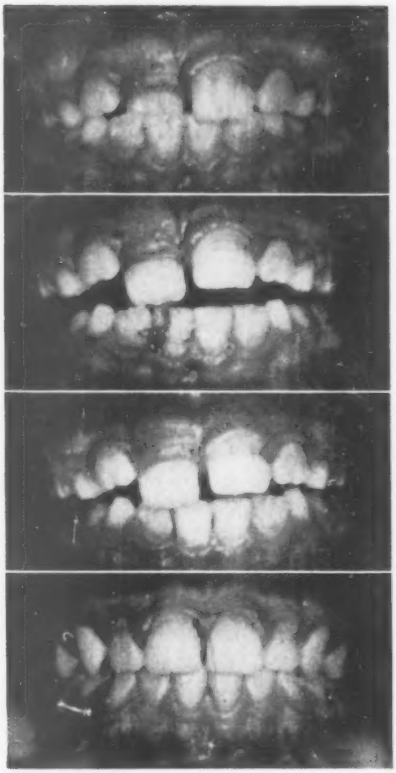

Fig. 11 • Simple ligation technic. First two photographs taken same day; third photograph three days later; fourth photograph several years later

to unlock maxillary incisors. This should not be used unless the overbite attained is sufficiently deep to insure retention when the relation of the incisors is changed.

Yale Technic • Figure 11 shows an extremely simple ligation technic introduced by Bert G. Anderson[15] for unlocking anterior cross-bites of certain types. If space is available and if forward mandibular shift is sufficiently a part of the problem to make it possible for the patient to retract the mandible so that the mallocked incisors can be opposed end-to-end, the mechanical part of a correction can often be accomplished in from one to three days. Although those who have not tried it condemn the method, the author has used it frequently and knows that it is gentle in its effect, which compares favorably with the effect of such widely advocated tools as the tongue blade. The method deserves study. If it

15. Anderson, B. G.: Rapid treatment in certain types of malocclusion. J.A.D.A. 29:577 (April) 1942.

Fig. 12 • Correction of pseudo Class III malocclusion by temporary ligation

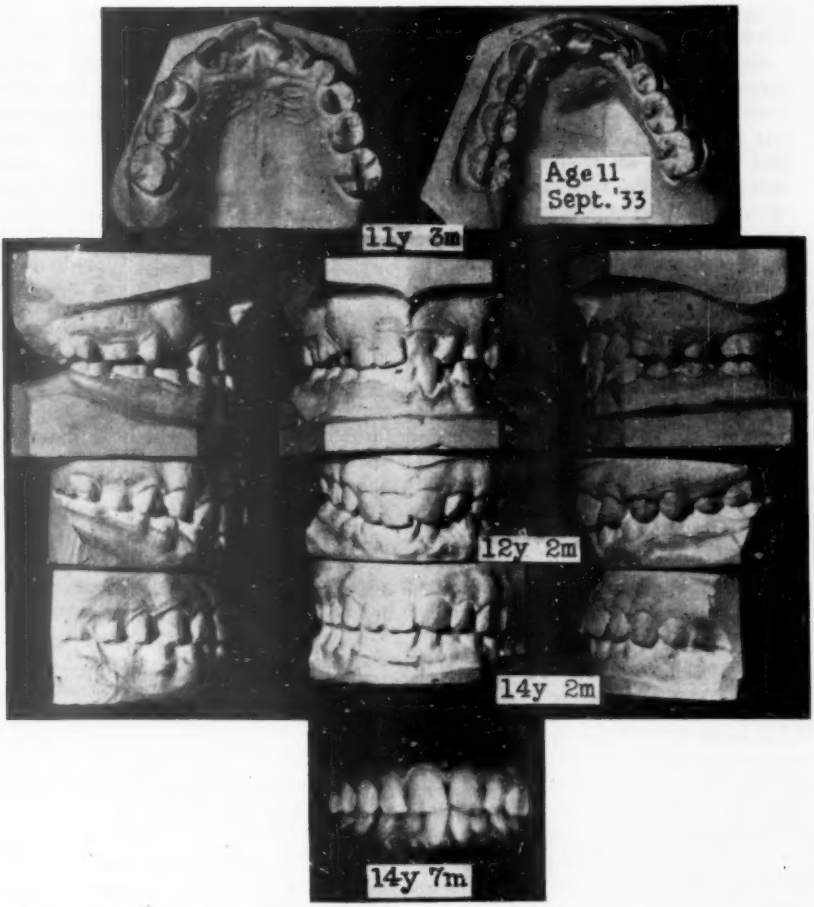

Fig. 13 • Correction of cross-bite, first by removable lingual wire and later by band with spur

is used, it becomes another means of simplifying and extending useful orthodontic service. The first two photographs in Figure 11 were taken on the same day, the third three days later, the fourth several years later. No other treatment was administered.

Figure 12 tells a similar story of a much more grotesque-appearing deformity. The most lingually posed maxillary central incisor could be brought into end-to-end relation with its opponent because this, as often happens, was an instance of a pseudo Class III malocclusion. These two opposing incisors only were ligated from Friday until Monday. All other inlocked incisors were freed by the correction of the right central incisor as shown in the third photograph; the condition several years later is shown in the fourth

photograph. No other treatment was administered.

Figure 13 shows four records of a patient who was observed only four times over a period of 40 months. In the first 11 months a simple removable lingual wire with an auxiliary spring was used in the routine manner to unlock the two maxillary incisors that were in crossbite. A self-limiting activation of the spring was employed. At the second visit 11 months later, the orthodontist was somewhat dismayed to find that full correction of the maxillary lateral incisor had not occurred principally because of its rotated position which held its distoincisal angle inlocked behind the mandibular cuspid. This was the only region still requiring treatment. Since the adjacent maxillary cuspid was not fully erupted, the effect of its progress toward complete eruption was used as a biomechanical means by which rotation and complete labial positioning of the lateral incisor might be accomplished. Such a simple but effective means might easily have been overlooked by an operator not in the habit of searching for the simplest approach to a problem. The lateral incisor was banded and a spur was soldered to the labial cervical aspect of the band, which extended distally to lie passive against the most cervical aspect of the labial surface of the cuspid then exposed. As the cuspid continued to erupt, it rotated the lateral incisor. Twenty-four and again 29 months later, as can be seen in Figure 13, there was an acceptable physiologic occlusion.

COMMENT

Intelligent young dentists with improved basic science training will develop ever simpler and more effective methods. Though at present the mechanistic approach in orthodontic treatment is indispensable, there will be new methods which will not be dependent on the mechanics now regarded as essential.

The Enemy • The enemy has no definite name, though in a certain degree we all know him. He who puts always the body before the spirit, the dead before the living; who makes things only in order to sell them; who has forgotten that there is such a thing as truth, and measures the world by advertisement or by money; who daily defiles the beauty that surrounds him and makes vulgar the tragedy. *Gilbert Murray, "Religio Grammatici."*

Fluorescence of teeth: a means of investigating their structure

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For many years it has been known that when human teeth are irradiated with ultraviolet light, they emit visible light, or fluoresce.[1,2] The color and intensity of this fluorescence vary from one individual to another and even from one tooth to another in the same mouth. Since, in general, the fluorescence of a substance is very sensitive to small differences in structure or composition, it is believed that a thorough investigation of the fluorescence of enamel and dentin will reveal details of structure not made apparent by other methods and may provide information which will aid in explaining the intricate mechanism of tooth decay.

As a first step in such an investigation it has been necessary to develop methods and equipment for exciting and analyzing the fluorescence of tooth structure. Methods have been developed for obtaining photomicrographs showing variations in intensity of the fluorescence of different areas of teeth and for investigating the spectral characteristics of the fluorescence. No attempt is made at this time to interpret the results other than to point out that they do show certain aspects of structure not revealed by methods previously employed.

METHODS AND APPARATUS

Preliminary investigation showed that the fluorescence of teeth was excited strongly by radiation in the region of 3,650 A.U.[3] Attempts to photograph or to examine spectrographically the radiation emitted by teeth revealed the need for a high intensity source of ultraviolet radiation to produce sufficient intensity in the fluorescence.

The lamp found to be most satisfactory for irradiating the specimens was the General Electric AH6. This is a 1,000 watt, water-cooled, mercury vapor lamp with a quartz jacket. It operates at 1,000 volts and at a pressure of approximately 2,000 pounds per square inch. Glass filters (Corning no. 9863 and no. 5860) were used to absorb the visible light and to transmit radiation in the region 3,200 to 3,900 A. U. A quartz condensing lens and a front surface mirror used with the lamp concentrated the ultraviolet radiation on the specimen. The lamp is shown in Figures 1 and 2.

The tooth specimens were prepared

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‡Chief, Dental Research Laboratory, National Bureau of Standards.

1. Benedict, H. C. The fluorescence of teeth as another method of attack on the problem of dental caries. (Abst.) J. D. Res. 9:274 (June) 1929.

2. Tiede, Erich, and Chomse, Heinz. Ober die Luminessenz der Zähne. Chem. Ber. 67:1988, 1934.

3. During this preliminary investigation it was observed that this radiation excited also a phosphorescence of several seconds' duration in teeth cooled to the temperature of dry ice or below.

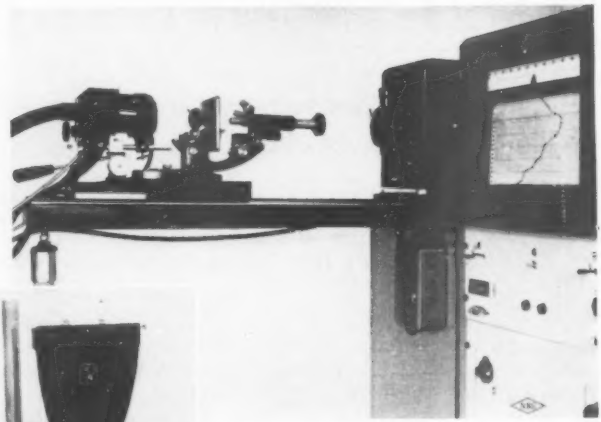

Fig. 1 • Photomicrographic camera and mercury vapor ultraviolet lamp used to produce fluorophotomicrographs. (Below)

Fig. 2 • Recording spectrometer used to study spectra of fluorescence of tooth structures. Microscope projects image of fluorescing tooth section onto slit of spectrometer. (Above)

by mounting the teeth in dental artificial stone and cutting serial sections approximately 200 microns thick by means of a water-washed, rubber-bonded carborundum disk 3 inches in diameter and 0.015 inch thick. These sections were then ground under water to a thickness of 25 to 75 microns on a polishing instrument.[4] This instrument consists of a reciprocating platform and a diamond-impregnated disk rotating with its axis perpendicular to the plane of the platform. Suction, operating through small holes in the platform, holds the specimens in place during the grinding. The thin sections were mounted on microscope slides. Sodium silicate was used as the mounting medium since it does not fluoresce, as do most of the commonly used mounting materials.

To make fluorophotomicrographs of the tooth sections, photomicrographic cameras (Bausch & Lomb Type L and American Optical Company no. 662D) were used with either camera lenses (Fig. 1) or a microscope according to the magnification desired. The microscope was equipped with a quartz Abbe condenser. Filters (Corning no. 3389 and no. 3962) were placed between the specimen and the film to prevent the scattered ultraviolet radiation from fogging the film. In addition to being selected for suitable absorption and transmission bands, these filters were carefully chosen to be free from fluorescence ex-

4. The cutting and polishing instruments used are similar to those designed at the National Institute of Dental Research.

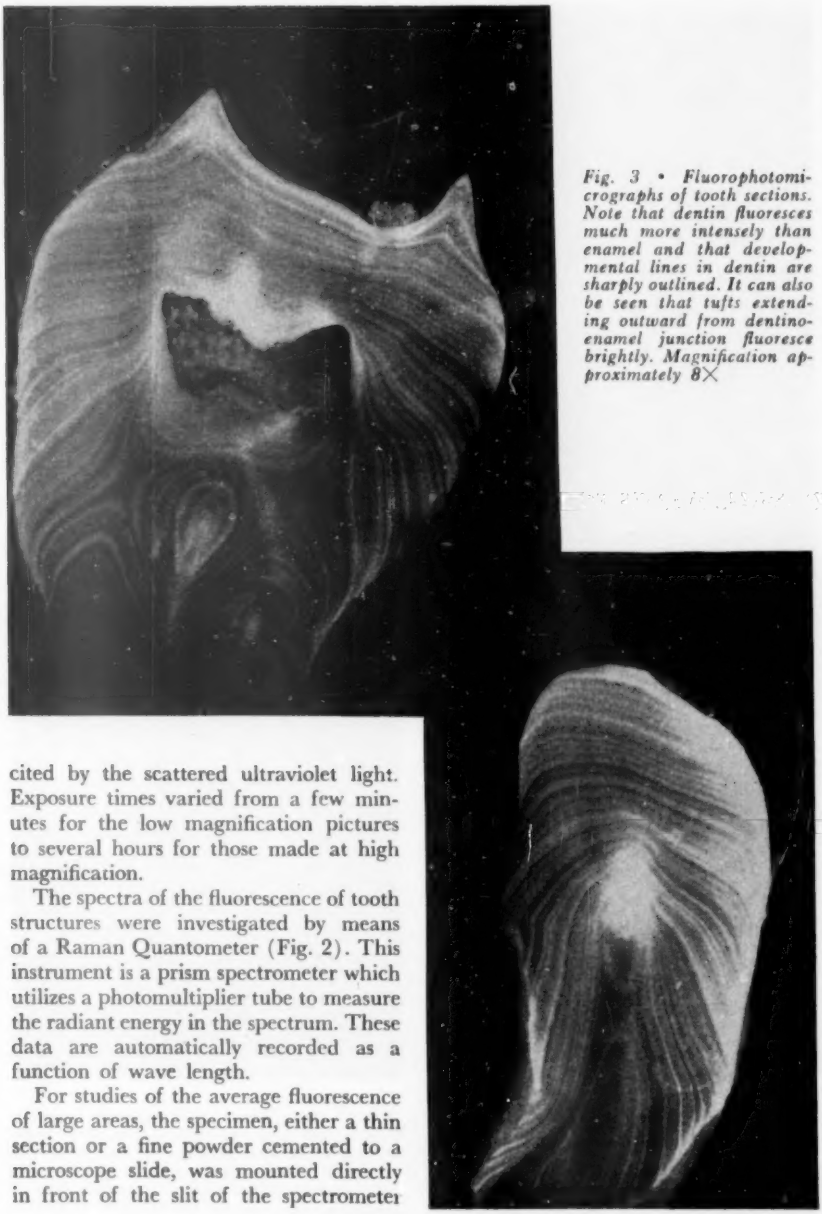

Fig. 3 • Fluorophotomicrographs of tooth sections. Note that dentin fluoresces much more intensely than enamel and that developmental lines in dentin are sharply outlined. It can also be seen that tufts extending outward from dentinoenamel junction fluoresce brightly. Magnification approximately 8×

cited by the scattered ultraviolet light. Exposure times varied from a few minutes for the low magnification pictures to several hours for those made at high magnification.

The spectra of the fluorescence of tooth structures were investigated by means of a Raman Quantometer (Fig. 2). This instrument is a prism spectrometer which utilizes a photomultiplier tube to measure the radiant energy in the spectrum. These data are automatically recorded as a function of wave length.

For studies of the average fluorescence of large areas, the specimen, either a thin section or a fine powder cemented to a microscope slide, was mounted directly in front of the slit of the spectrometer

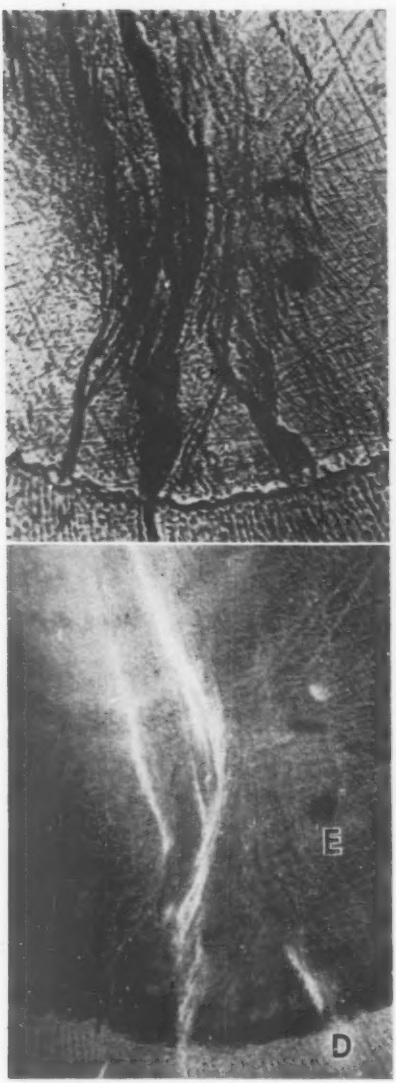

Fig. 4 • Tooth section photographed by visible illumination, above, and by fluorescence excited by ultraviolet illumination, below. Lamella, shown as dark lines under visible illumination, fluoresces brilliantly under ultraviolet illumination. E, enamel; D, dentin. Magnification approximately 200×

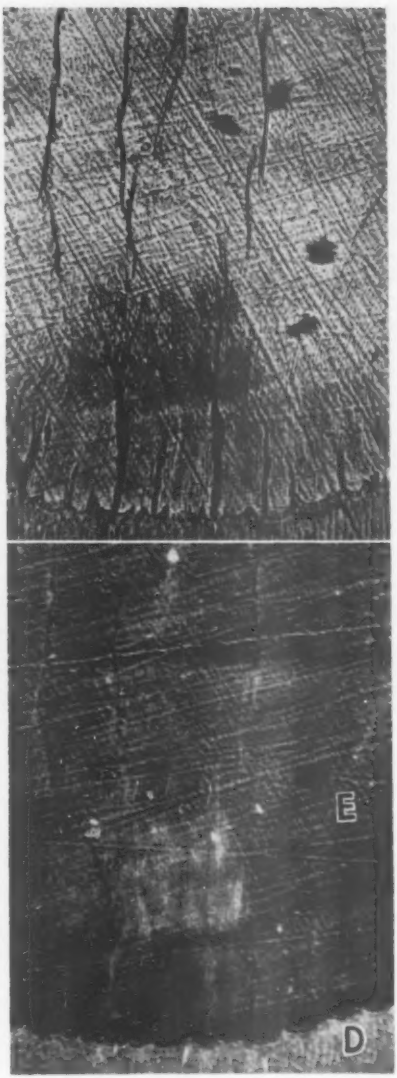

Fig. 5 • Comparison of visible light illumination, above, and fluorescence, below, of tooth section. Dark lines seen in this section do not fluoresce, thus indicating that they are probably artefacts produced during preparation of specimen. E, enamel; D, dentin. Magnification approximately 200×

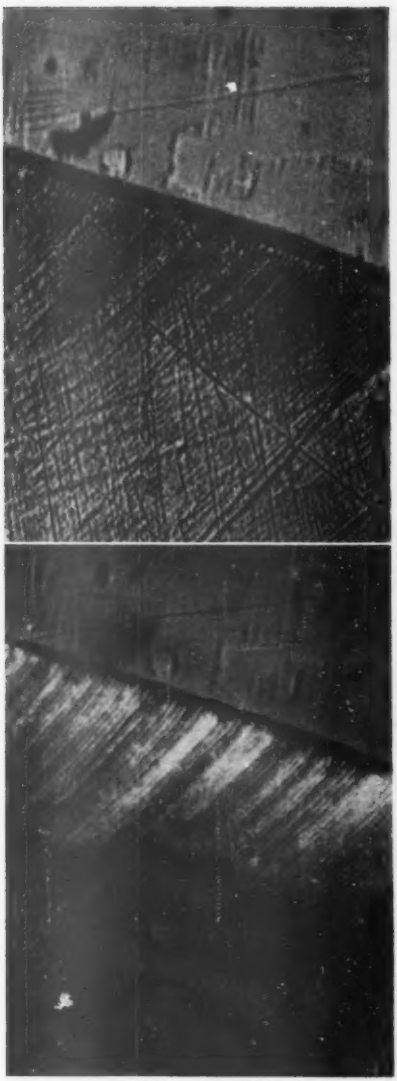

Fig. 6 • Comparison of visible light illumination, above, and fluorescence, below, of enamel section. Area of bright fluorescence near outside surface of enamel may be an indication of penetration of materials into tooth. Magnification approximately 200×

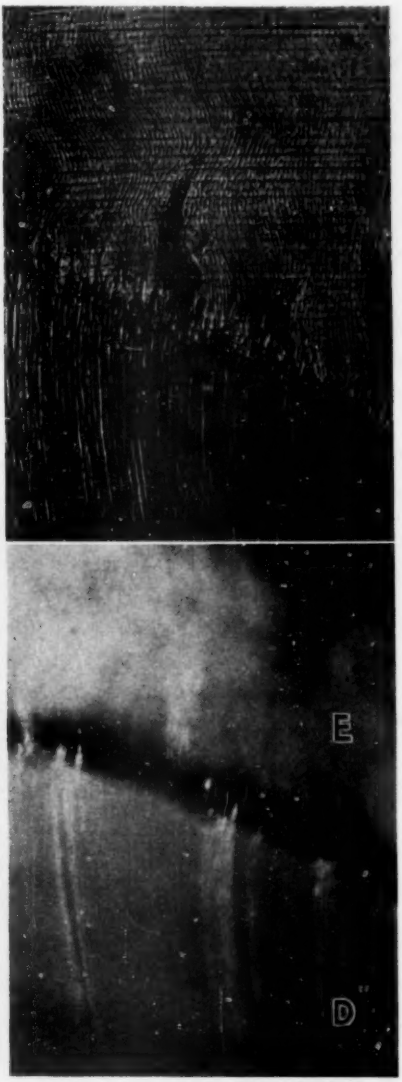

Fig. 7 • Dentinoenamel junction as seen by visible light illumination, above, and by fluorescence, below. Note absence of fluorescence in immediate areas of junction and intense fluorescence of tufts extending into enamel. D, dentin; E, enamel. Magnification approximately 300×

and irradiated with ultraviolet light. In order to investigate the fluorescence of small areas of the specimen, a microscope was used to project an image of the area to be studied onto the slit of the spectrometer.

RESULTS

Photomicrographs of tooth sections are shown in Figures 3 to 8. It can be seen that certain details of the structure of teeth are revealed clearly by their fluorescence. The lines of Owen are particularly notable in Figure 3. A comparison of the information obtained by using white light and fluorescent light is made in Figures 4 to 8. The dark structures shown in Figure 4 above, extending from the dentin through the enamel, fluoresce strongly when subjected to ultraviolet radiation (Fig. 4, below), indicating that they are lamellae. Since the dark structures shown in Figure 5, above, do not fluoresce (Fig. 5, below), they are probably artefacts. Figure 7 shows a narrow band of practically no fluorescence at the dentinoenamel junction, followed by a region of high fluorescence in the vicinity of the enamel tufts. In the dentin the most intense fluorescence occurs along the dentinal tubules (Fig. 8).

Figures 9 and 10 show tracings of the fluorescence spectra of powdered enamel and powdered dentin obtained by means of the recording spectrometer. It is seen that dentin fluoresces approximately four times as intensely as enamel and that the

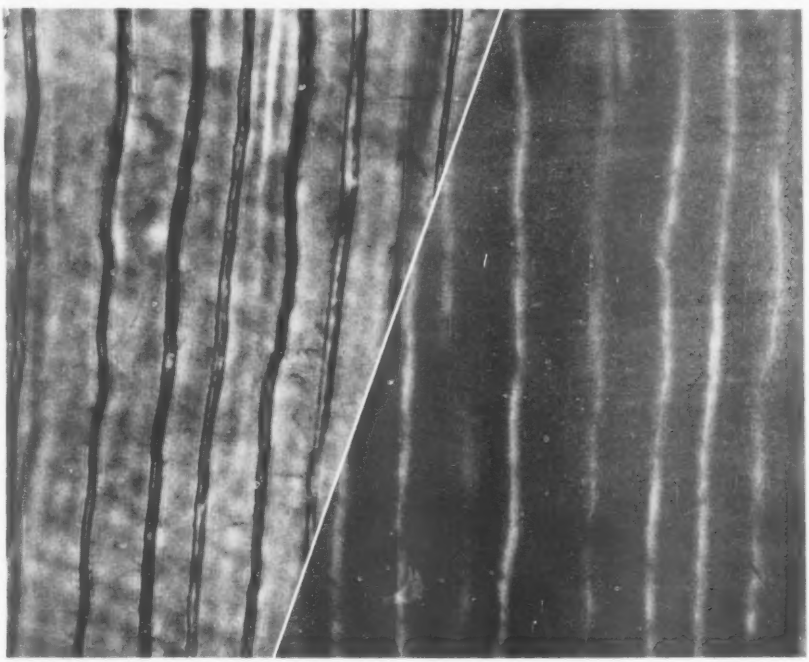

Fig. 8 • Dentin section illuminated by visible light, left, and by ultraviolet radiation, right. Fluorescence of dentin occurs along dentinal tubules. Magnification approximately 1,000×

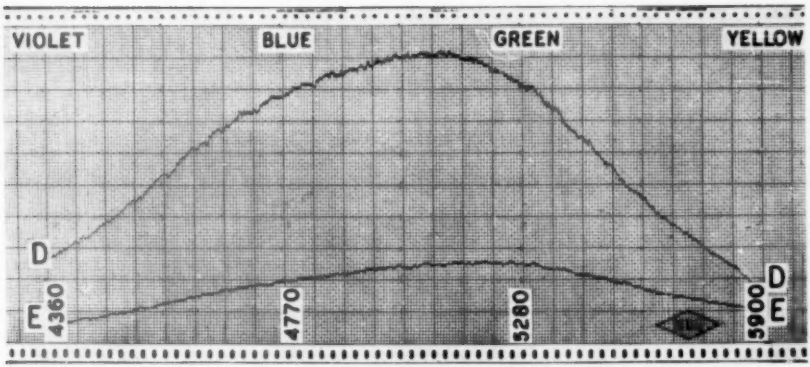

Fig. 9 • Fluorescence spectra of enamel and dentin as recorded by spectrometer. Intensity of fluorescence of dentin approximately four times that of enamel

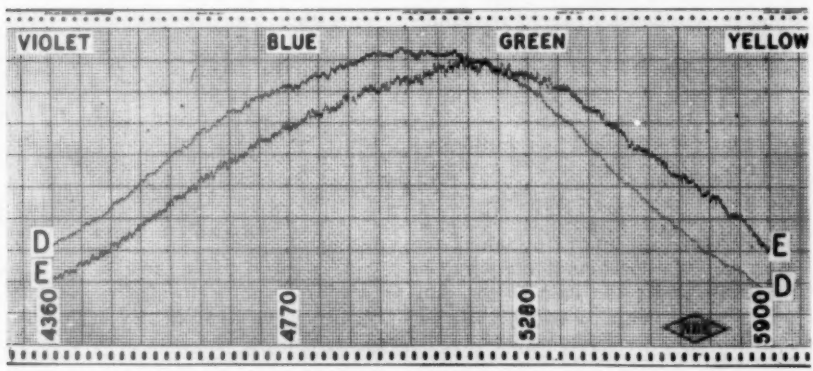

Fig. 10 • Fluorescence spectra of enamel and dentin with recorder gain increased on enamel curve to show more clearly relative position of peaks of curves

fluorescence of the enamel contains more yellow than that of the dentin. Inasmuch as the curves have not been corrected for the change in sensitivity of the photomultiplier at different wave lengths, the results are relative rather than absolute values. Work is now in progress to obtain the fluorescence spectra of small areas of tooth sections, such as a portion of a lamella, by projecting the image of the fluorescent area onto the slit of the spectrometer.

CONCLUSIONS

Methods have been developed for investigating enamel and dentin by means of the fluorescence which they emit when irradiated with ultraviolet light. Photomicrographs of the fluorescence of tooth sections show details of structure not revealed by other methods. To obtain more specific information on structure, studies of the spectra of the fluorescence are being made.

Approach to surgical diagnosis of the temporomandibular articulation through basic studies of the normal

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In any discussion of the anatomy of the temporomandibular joint, the extremely wide range of what is called normal must be considered. Accurate recognition and adequate knowledge of the normal are absolutely essential before it is possible to make a correct diagnosis of the abnormal.

Diagnosis of pathoses and traumatic injuries of the joint is still a difficult problem for the oral surgeon. This is partly because it is a compound diarthrodial joint with great freedom of motion. Also, the location of the joint, immediately under the base of the skull, makes it difficult to obtain a clear picture of its various components.

PURPOSE OF THE STUDY

The purpose of the study here presented was twofold: first, to discover an adequate technic for roentgenographing the condyloid process, and second to verify the statements of standard anatomical texts with regard to the features of the condyle.

In the past, the condyle, an important part of the articulation, has been studied in general without sufficient consideration of the wide variations in the morphology of the capitulum in different individuals and in the two condyles of the same normal person.

Textbooks of anatomy, as well as the work of investigators, have not shown the many variations from the normal. This study aimed to determine whether the two condyles in a normal person are identical in form, size, or angulation with the midsagittal plane. This study also aimed to verify a statement by Gray which is repeated in many textbooks,[1,2] that the long axes of both condyles if prolonged to the midline would meet near the anterior margin of the foramen magnum.

As regards the technic of roentgenography, a comparative analysis was made of the various technics used in the roentgenography of the joint with regard to their adequacy. A new technic, consisting of a combination of various standard technics, was also developed in order to survey the right and left condyles along their long axes. This technic was tested on living subjects and dry anatomical specimens.

The diagnosis of disturbances of the temporomandibular articulation which

Thesis submitted in partial fulfilment of requirements for the degree of M.Sc.D., Graduate School of Medicine, University of Pennsylvania, Philadelphia.

1. Gray, Henry. Anatomy of the human body, ed. 25. Philadelphia, Lea & Febiger, 1948, p. 127, 130, 133.

2. Piersol, G. A. Human anatomy including structure and development and practical considerations, ed. 5. Philadelphia, J. B. Lippincott Co., 1916, p. 212.

require surgical treatment is frequently difficult, if not impossible, unless the operator has a basic understanding of the many variations of what is called "normal."

It is not unusual for an oral surgeon to depend on roentgenograms which are not adequate in that they do not show, for example, the extent of ankylosis present in a given instance. Ankylosis may extend even to the base of the skull and the surgeon may not have an adequate picture of the condition until he is actually operating.[3]

GENERAL METHODS USED

A study was made of 35 selected individuals between 20 and 30 years of age. Special roentgenographic exposures were taken of the condyles. Tracings of delineations of the condyle along its long axis were made.

An orthographic study was made of the temporomandibular joints of cadavers obtained from the Graduate Anatomy Laboratories, Graduate School of Medicine, University of Pennsylvania. The experiment was done in the department of roentgenology of the dental school, University of Pennsylvania. The purpose was to test the value of injecting radiopaque materials in conjunction with the special roentgenographic technic used in the survey.

A roentgenographic and photographic survey was made of 20 dry specimens obtained from the Graduate Anatomy Laboratories of the University of Pennsylvania. The range of morphologic variations of the condyles was determined for that group.

A comparative analysis of the data obtained from both groups is presented.

REVIEW OF LITERATURE

As early as 3,000 years B.C., the morphology of the human lower jaw was known to the Surgeon of the Old Kingdom who practiced on the banks of the River Nile, probably contemporary with the Giza Pyramids.[4, 5]

The Edwin Smith Papyrus,[5] the earliest known surgical text, mentioned 27 cases of head injuries. Case 25 reported in that treatise, titled "Dislocation of the Mandible," showed an adequate diagnosis of the condition. In this treatise the practitioner was instructed how to deal with mandibular dislocation in a way that would not differ from that of today. "The surgeon's directions for the reduction of the dislocated mandible, with the 'thumbs upon the ends of the two rami of the mandible in the inside of his mouth,' while the fingers of both hands are clutching the mandible below, that is, on the outside." It is worthwhile to quote here the literal translation by Breasted:[5]

> If thou examinest a man having a dislocation in his mandible, shouldst thou find his mouth open [and] his mouth cannot close for him, thou shouldst put thy thumb[s] upon the ends of the two rami of the mandible in the inside of his mouth [and] the two claws [meaning two groups of fingers] under his chin [and] thou shouldst cause them to fall back so that they rest in their places.

The Papyrus also shows familiarity with the system of muscles, tendons and ligaments attached to the human mandible as well as its articulation and the anchorage of the temporal bone. Their correct diagnosis and treatment of dislocations were based on sound firsthand observations and anatomy which they learned from "embalming."[6]

In recent literature the general conception has been that the temporomandibular joint is a compound diarthrodial

3. Ennis, L. M. Personal communication.

4. Junker, H. Expedition dem Wiener Akademie auf dem Friedhof von Gizeh Vorbrecht, 1914, p. 31.

5. Breasted, J. H. Edwin Smith surgical papyrus. Chicago, University of Chicago Press, 1930.

6. Amer, A. Oral surgery in the Nile valley 3,000 years B.C. Thesis, basic science course, Graduate School of Medicine, University of Pennsylvania, Philadelphia, 1950.

joint and is described as ginglymo-arthrodial[7] because of its hingelike and gliding character. It consists of two opposing bony surfaces separated by an interarticular disk and enclosed by an articular capsule or ligament.

From the general description of the components it becomes necessary to review what has been considered the normal and variations of normal and, in particular, what concerns the condyle.

In the medical dictionaries the condyle has been defined as follows:[8]

> Condyle (Kondylos): any rounded eminence such as occurs in the joints of many of the bones, especially the femur, humerus and mandible (condylar, adj.).

Piersol[9] mentioned that the inferior maxilla develops in two symmetrical halves which soon fuse. Describing the condyle, he stated:

> This presents an articular surface convex from before backward and higher at the middle than at the ends. The largest diameter is not quite transverse, for the axes, if prolonged, would meet near the front of the foramen magnum.

Gray[1] said that the mandible:

> . . . consists of a curved horizontal portion, the body, and the two perpendicular portions, the rami which unite with the ends of the body nearly at right angles.

He states on page 130, in his description of the condyloid process:

> Its long axis is directed medialward and slightly backward, and if prolonged to the middle line will meet that of the opposite condyle near the anterior margin of the foramen magnum.

Then he described the changes produced in the mandible by growth in the adult and in old age.

> In the adult . . . the ramus is almost vertical in direction the angle measuring 110° to 120°. In old age—The angle measured about 140° and the neck of the condyle is more or less bent backwards.

Swenson[10] mentions in his text that the shapes of the condyle vary greatly and that the direction of the long portions, if extended, would meet "in some part of the foramen magnum." He shows on page 41, figure 38, a photograph of a superior view of the mandible showing the condyles with the legend: "Long axis meets about anterior of foramen magnum."

Although Sicher[11] in 1949 stated that the axes of the two condyles formed an obtuse angle of 150 to 160 degrees which is open to the front, he did not define where the point of the angle was located. He also stated[12] "In most individuals the coronoid process is higher than the condyloid process."

In 1951 Schweitzer[13] quoted the following:

> If the width of the condyle heads were extended they would meet somewhere in the neighborhood of the foramen magnum.

Most of the other authors and investigators have not mentioned or defined clearly the wide range of morphologic variations of the normal condyles, and in particular those in the same individual. It is only in the last two decades that a combination of both clinical observations and the use of roentgenograms has been used.

REVIEW OF TECHNICS USED IN PREVIOUS STUDIES

Ennis[14] has stated that:

> . . . no two individuals are alike, in fact, to go just a little further, different parts of the same individual vary.

7. Shapiro, H. H. Applied anatomy of the head and neck, ed. 2. Philadelphia, J. B. Lippincott Co., 1947, p. 108.

8. Blakiston's new Gould medical dictionary. Philadelphia, Blakiston Co., p. 238.

9. Piersol, G. A. Human anatomy including structure and development and practical consideration, ed. 5. Philadelphia, J. B. Lippincott Co., 1916, p. 212.

10. Swenson, M. G. Complete dentures, ed. 2. St. Louis, C. V. Mosby Co., 1947, p. 39, 46.

11. Sicher, H. Oral anatomy. St. Louis, C. V. Mosby Co., 1949, p. 61.

By his study of the development of the temporomandibular articulation of infants at birth, it was possible to study the joint at maximum development when the jaws had not functioned. He could assume any variance in the right and left joints was due to development and was not a result of attrition, habits of chewing or unbalanced occlusion. He noted that the long axis of the condyles, referred to the sagittal plane, extended medially and slightly backwards but varied with the right and left side of the head. He found and illustrated clearly the variations in size and form of the condyle in the same individual at birth. His method of delineation was by using tin foil and taking roentgenograms.

The work of Blume,[15] Thompson[16] and Boman[17] was concentrated mostly on the relationship of the condyle to the glenoid fossa and the articular eminence. However, their studies of the condyle included the entire joint from the lateral aspect.

Harvey,[18] in his investigation and survey of malocclusion and ear symptoms with particular reference to barotrauma, made tracings of roentgenograms and came to the conclusion that there was considerable variation not only in joints of patients having the same type of occlusion and degree of overclosure but also in the two joints of the same patient. No correlation could be found between the fossae and the condyles and he found it difficult to determine from the roentgenograms which joints were normal and which were abnormal.

Norgaard[19] used an aqueous, iodine-containing contrast medium injected into the cavities of the joint. The roentgenograms taken were in the oblique lateral transcranial position and corresponded approximately to Schüller's projection.

He was not so much concerned with the morphologic variations, as discussed in his chapter on a normal temporomandibular arthrogram,[20] as he was with the joint cavities and the disk.

With sectional roentgenography, designated tomography, planigraphy, stratigraphy[21] and laminagraphy, according to the technic and apparatus used, the outline of the condyles could be presented in sections of definite thicknesses. Most of the work done[22-24] was by the lateral projections and there was no definite representation of the condyle showing the full length of the long axis.

In general it may be said that the studies of nearly all investigators, which have been by delineation of the joint through roentgenologic exposures, have represented the positional changes from the lateral aspect and not the morphologic variations of the capitula in their proper relationship to the plane of occlusion.

EFFECT OF PAST WORK ON THE METHODS OF THIS STUDY

The roentgenographic location of the condyloid process and its articulating

12. Sicher, H. Oral anatomy. St. Louis, C. V. Mosby Co., 1949, p. 62.

13. Schweitzer, J. M. Oral rehabilitation. St. Louis, C. V. Mosby Co., 1951, p. 30.

14. Ennis, L. M. Study and development of muscles of mastication, the temporomandibular articulation and the styloid process. Am. J. Orthodont. & Oral Surg. 31:495 (Oct.) 1945.

15. Blume, D. G. A roentgenographic study of the positions of the mandible in malocclusion of the teeth. Thesis for M.S.D., Northwestern University Dental School, Chicago, 1947.

16. Thompson, J. R. Oral and environmental factors as etiological factors in malocclusion of the teeth. Am. J. Orthodont. 35:33 (Jan.) 1949.

17. Boman, V. R. A roentgenographic study of the position of the mandible in normal occlusion of the teeth. Thesis for M.S.D., Northwestern University Dental School, Chicago, 1948.

18. Harvey, W. Investigation and survey of malocclusion and ear symptoms with particular reference to otitic barotrauma. Brit. D. J. 85:219 (Nov. 19); 85:249 (Dec. 3) 1948.

19. Norgaard, Flemming. Temporomandibular arthrography. Copenhagen, Einar Munksgaard, 1947, p. 30, 31.

20. Norgaard, Flemming. Temporomandibular arthrography. Copenhagen, Einar Munksgaard, 1947, p. 49, 54.

21. Amer, A. Tomographic en stomatologie; service de stomatologie Hospital la Pitie. Thesis, Paris University, May 1947.

22. Lindblom, Gosta. Technique for roentgenographic registration of the different condyle positions in the temporomandibular joint. Sartryck ur Skandinavish Tannlaegeforeming 26:193, 1936.

23. Higley, L. B. New and scientific method of producing temporomandibular articulation radiograms. Internat. J. Orthodont. 22:983 (Oct.) 1936.

24. Schier, M. B. A. The temporomandibular joint. D. Items Interest 70:899 (Sept.) 1948.

head at the base of the skull requires the use of special technics to prevent superimposition of other anatomic structures. This can be done only by a variation or combination of standard technics depending on the case presented.

The following are the standard technics which will be analyzed and discussed:

Method 1 • Oblique-lateral Infracranial Projection. The plate and midsagittal plane are parallel.

The central rays are directed from below, about two fingers breadth below and behind the angle in an upward and slightly forward direction toward the joint to be examined (Fig. 1).

Comment • The rays were directed strongly on the condyle from below, so that the medial part forms the upper contour and the lateral part of the image and combines with the shadow of the neck of the condyle.

This projection may be of some value in the diagnosis of fractures and pathoses at the neck of the condyle but not for the morphology of the entire condyle.

Method 2 • Oblique-lateral Transcranial (Schüller's Projection). The film is placed nearly parallel to the midsagittal plane with the nose turned from 10 to 15 degrees toward the cassette.

The central ray is directed toward the joint at an angle of 25 degrees from the perpendicular plane. Lindblom applied the same projection by directing the central rays at a point 2 cms. behind and 6 cms. above the auditory meatus directing the rays toward the joint to be examined (Fig. 1).

Comment • The same comment may be made on this method as on Method 1. This projection also may reveal the contour of the joint clearly but the condyles cannot be fully presented with their proper relationship to the plane of occlusion.

Method 3 • Frontal Projection. The midsagittal plane is perpendicular to the plane of the plate, the nose and supraorbital ridge touching the plate.

The central rays are directed in the midsagittal plane (Fig. 1).

Comment • The condyle as a whole—neck and capitulum—cannot be separated from the base of the skull or the temporal bone on both sides without using an angulation from 15 to 25 degrees from the perpendicular, thus there is a considerable amount of distortion.

Although both angles of the mandible, ascending rami and the necks of the condyles on both sides are well presented, the most medial portions of the long axes of the condyles are often obscured and proportionately distorted.

Method 4 • Parma's Method. The midsagittal plane is parallel with the plane of the plate.

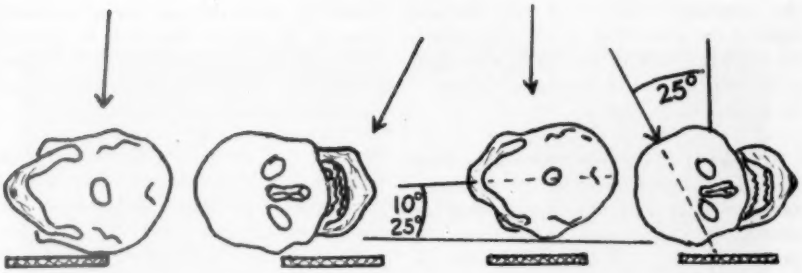
The modern shockproof high tension x-ray tube is placed close against the face with the long axis of the tube exactly parallel with the base of the skull. The central rays pass through the condyle in an oblique direction (Fig. 1).

Comment • The rays are directed strongly on the condyle in an oblique direction as the central rays are aimed a little from below upwards at the joint which is close to the film. Therefore the condyle appears slightly enlarged and distorted.

Although the relation of the condyle to the articular tubercle is distinct, the entire osseous structure of the condyle along its lateromedian axis cannot be represented.

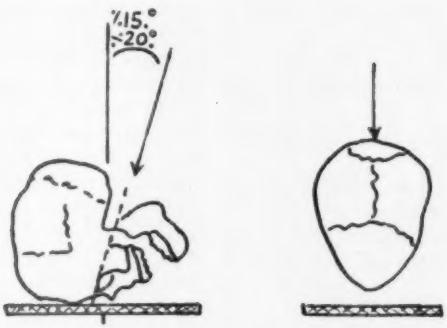
Method 5 • Hole's Projection (After Pordes). The midsagittal plane and plate are parallel.

The central rays are adjusted so as to pass through the interval between the sigmoid notch and the lower margin of

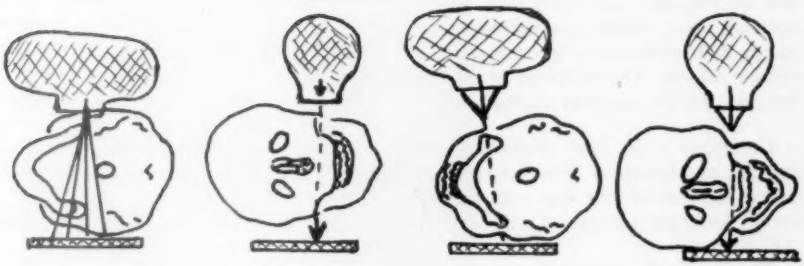


Oblique-lateral: infracranial

Oblique-lateral: transcranial



Frontal projection (P.A.)



Short-distance technic: Parma's projection

Hole's after Pordes' projection

Fig. 1 • Schematic presentation of conventional projections

the zygomatic arch and are directed against the joint close to the film, parallel with the base of the skull, or rather, a little from below upwards (about 5 to 10 degrees) (Fig. 1).

Comment • This method utilizes both the advantages offered by the short-distance technic and also the absence of obstructing structures. Therefore the presentation of the joint cavities is distinct.

The rays are directed on the condyle a little obliquely from the front. Although the relation to the articular tubercle is distinct, the osseous structure of the condyle is not presented along its lateromedian axis.

Method 6 • Axial Roentgenography of the Skull.

1. Submentovortex projection (Schüller position):

The base line of the skull is placed parallel with the plane of the film.

The central rays are directed at right angles to the base line and through sella turcica.

2. Verticosubmental projection:

The head rests on the tip of the fully extended chin which is placed on the film.

The central ray is directed through sella turcica at right angles to the base line of the skull. It passes through the coronal plane which lies three-quarters of an inch anterior to the external occoustic meatus. The midpoint of the film has to coincide with the central ray.

Comment • In both projections the central ray bisects a line between the outer canthus of the eye and the external auditory meatus at an angle of 100 degrees.

The methods ordinarily applied to obtain these two projections are sometimes inapplicable to obese and short-necked patients. These methods were meant primarily to show the sphenoidal sinuses in particular and the other structures at the base of the skull in general.

The two condyles cannot be represented fully in their proper relation to each other and to the occlusal plane.

Method 7 • Arthrography. A contrast medium is injected into the cavities of the temporomandibular articulation and roentgenograms are taken of the joints.

Standard technics—lateral projections as well as tomographic roentgenograms in the frontal plane—are used immediately after the injection (Fig. 2).

Comment • The use of a disclosing medium allows a definite representation of the outline of the joint cavities. Changes of the cartilaginous part of the joint also may be depicted by this method.

The condyle in the lateral projections is obscured partially and sometimes completely. This is because the condyle is capped by the interarticular elements.

No projection has been used which would fulfill the aims of this study after injecting the joint. Therefore, the following experiment was performed to evaluate the use of disclosing solutions for this purpose.

TEST OF USEFULNESS OF CONTRAST MEDIUM

Material • The following materials were used: Cadaver of edentulous female, about 60 years old, with apparent asymmetry of face.

Screen and no-screen films, 8 by 10 inches.

Barium solution of appropriate consistency in place of solution previously used by Norgaard.

Luer syringe and short medium sized needle.

Method • Two conventional lateral projections were made for each joint (Fig. 2, A and B). A third roentgenogram was taken in the same manner as the con-

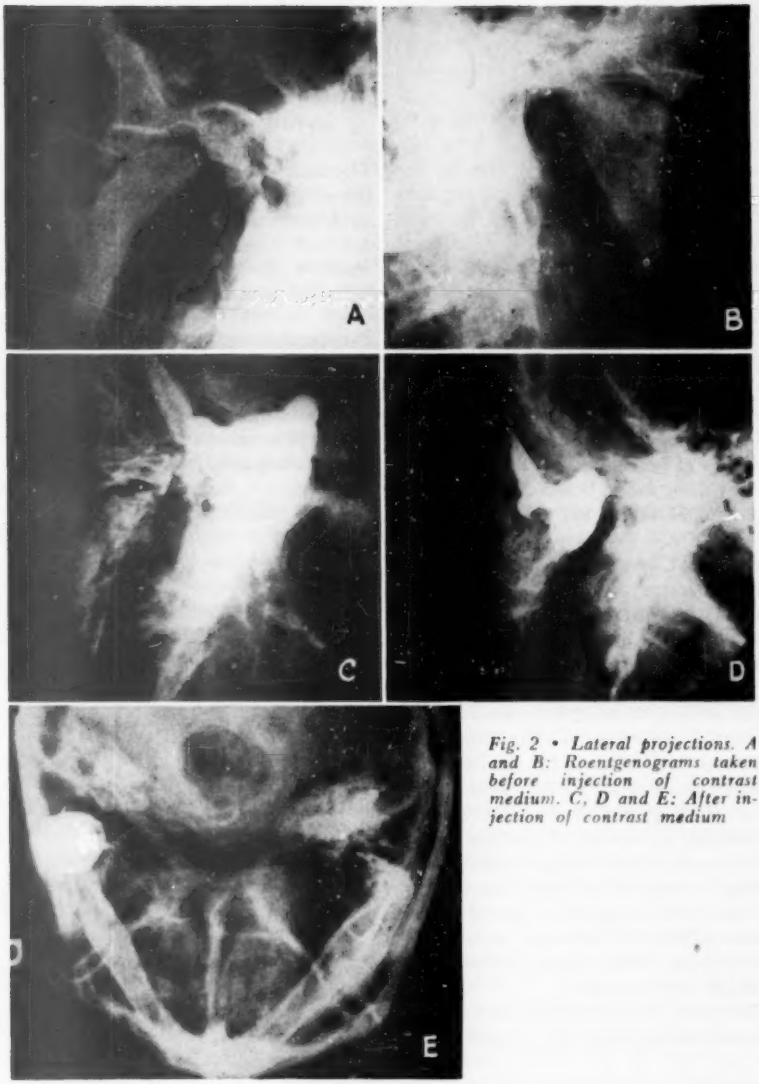


Fig. 2 • Lateral projections. A and B: Roentgenograms taken before injection of contrast medium. C, D and E: After injection of contrast medium

templated technic for the study to show both condyles in the same projection.

The two joint cavities were filled with barium solution by the following technic. The condyle was palpated. The mouth was opened about two fingers breadth which made it easier to locate the condyle than it would have been with the mouth closed or wide open. Site of injections was midway between the tragus and the palpated condyle. The direction of inserting the needle was inwards and at the same time a little obliquely forward and upward with the point of the needle aimed at the posterior aspect of the condyle. The barium solution was injected into the joint cavities of both the right and left sides. Then the needle was removed.

Roentgenograms were taken immediately of both joints in the same positions as those taken before the injections (Fig. 2, C, D, E).

Results and Comment • The study of the roentgenograms taken after filling the joint cavities with contrast medium shows that the outline of the fossae can be defined especially in the lateral projections. On the other hand, the osseous structure, as well as the outline of the condyles, cannot be fully represented. They are overshadowed and capped by the contrast medium particularly in the special projection used in the study (Fig. 2, E). Accordingly it is assumed that the use of a contrast medium is inserviceable when making a diagnosis of some disorders of the joint; for example, unilateral or bilateral ankylosis or exostosis. In addition it is of no assistance when inflammatory conditions are present.

Therefore it was decided not to use disclosing solutions in the present study.

Deductions • In analysis of the previous technics and their variations it was concluded that none of them was sufficient when used alone. There is something in each that could be utilized in the development of a technic to serve the purpose of this survey and also a technic which will be of value when making a surgical diagnosis of the temporomandibular joint.

METHODS OF THIS STUDY

The following technic was developed for this study and used in the survey of the 35 selected individuals.

Materials • A handmade cassette holder was fixed to a vertical stand. The stand could be raised or lowered as needed. Par-speed cassettes and 8 by 10 inch films were used. A tape measure or a T square five feet long was used (the latter was found to be of great value in getting the exact measures). The usual dental x-ray machine was used.

Position of Patient • The ordinary dental chair was found to be the most appropriate when this technic was used. The patient was seated with the back of the chair at an angle of approximately 140 degrees. The patient was most relaxed in this position.

Position of Head • The head rest was lowered so that the plane of occlusion was perpendicular to the floor. In this position the line from the ala of the nose to the tragus of the ear was perpendicular to the floor and also parallel with the cassette holder. The midsagittal plane was perpendicular to the plane of the film. The cassette was placed as near as possible to the head.

Target-Film Distance • The target-film distance was five feet, measured from the center of the tube to the center of the film.

Central Rays • The central rays were directed at right angles to the occlusal plane and the film. They should be at the same level as the capitula and pass midway between the two.

Exposure • With 65 kilovolts, 15 milliamperes and Par-speed cassette, the exposure range was six to seven seconds. It was found that caution with the exposure was extremely important in order to show the desired structures clearly.

Analysis and Evaluation of the Technic • The position used in this technic is comfortable for various persons, including the obese and the short-necked. This technic is not difficult to master and the use of the dental chair in the manner shown in Figure 3 facilitates the procedure.

Additional advantages of the technic are:

1. Because of the application of a long target-film distance, as well as the fact that no tilting of either the x-ray tube, the head of the patient or the film is resorted to, the possibilities of distortion are minimized greatly.
2. It offers a definite representation of both condyles in one projection and in their proper relationship to the plane of occlusion and the midsagittal plane and the axial view of the rami.
3. The osseous structures, as well as the contour of the condyles along their lateromedial axes, are depicted clearly. Their shadows can be shown free to a great extent from superimpositions or interference of the heavy shadows of neighboring structures.
4. The relation of both joints to the neighboring structures at the base of the skull can be depicted.
5. When pathoses of the condyles such as ankylosis, osteoma and other bony lesions are present, the extent of these lesions as well as the involvement of the surrounding structures at the base of the skull can be determined and evaluated so as to plan the surgical approach and procedures. There is a possibility that such a projection may be helpful in estimating the proportions and measurements in jaw resections and also help to evaluate the possibility of surgical repair of traumatic injuries of the joint and the mandible.

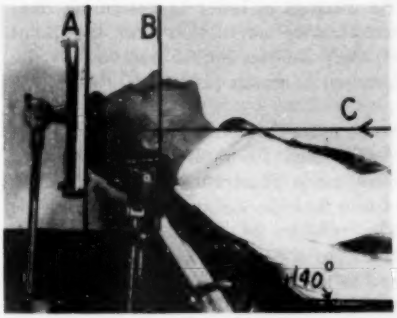


Fig. 3 • Roentgenographic technic. A represents plane of plate, perpendicular to floor. B represents line from ala of nose to tragus of ear, perpendicular to floor. C represents central rays perpendicular to both plate and plane of occlusion. Target-plate distance, five feet

Determination of Morphologic Variations of the Condyles • The technic as described was used in taking roentgenograms of the temporomandibular articulation of 35 living persons. This group represented healthy individuals, aged 20 to 30 years.

The height and weight of each person was recorded. A short dental history was taken noting particularly the temporomandibular articulation and the function of the masticatory apparatus. In most cases the occlusion was approximately normal and there was no pathosis present in any instance. Roentgenograms were taken of all the subjects using the same technic and under similar circumstances with the teeth in centric occlusion.

The delineation of the condyles was traced on the original roentgenograms of each person and represented in proper relation to the midsagittal plane as well as to the occlusal plane. The lateromedian axes of both condyles were extended in

the tracings in order to determine their comparative angulation and the point of their intersection in relation to the foramen magnum (Fig. 4).

Study of 35 Persons, Aged 20 to 30 Years • Tracings from the roentgenograms were made illustrating the wide range of morphologic variations of 70 condyles. The relation of the condyles to each other, to the midsagittal plane (MM), and to the horizontal plane (HH) drawn at right angles to MM, were shown.

The lateromedian axes of both condyles in each case were extended to determine the angle formed by the intersection of their extensions and the location of the intersection of their extensions in relation to the anterior border of the foramen magnum (FF).

Figure 5 shows the variations in 35 average living persons between the ages of 20 and 30 years, the difference in shape and size and in the angle of the condyles in relation to the midsagittal plane and the location of the intersection of the axes with relation to the foramen magnum.

Study of Dry Specimens • The second part of the study consisted of determining the morphologic variations in 20 dry specimens. A comparison was made between the findings in the dry specimens and those in the living persons.

Two methods were used in this part of the study.

1. A photographic survey was made of the dry specimens and data obtained based on firsthand observations.

2. Roentgenograms were taken of each mandible by means of three projections —right and left lateral projections and vertical.

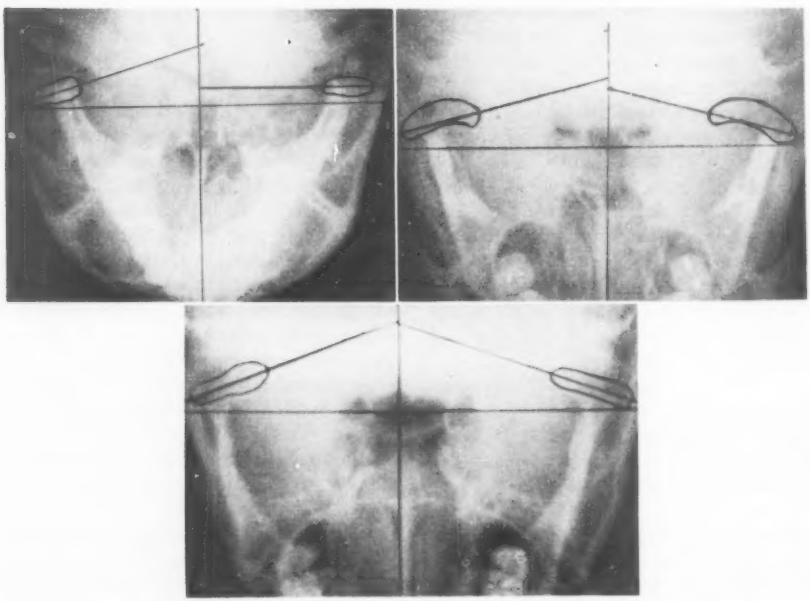


Fig. 4 • Morphological variations of condyles and their relative angulations

Lateral Projections • Specimens were placed flat on the film holders with the lateral side of the ascending rami in direct contact and fixed to the film holders. Metal wires were stuck to the film holders in such a way that their opaque shadows produced on the exposed films a vertical and a horizontal plane. Pictures were taken of the right and left side of each mandible.

Vertical Projections • These roentgenograms were taken by the same technic as that used for the lateral projections. Two opaque lines representing the midsagittal and horizontal planes were obtained by placing two wires directly on the film holder and the specimens were placed according to the appropriate positions. A Kodak no-screen film was used. The film target distance was five feet and exposure was four seconds.

There was a similarity between the methods used in the study of these dry specimens and those used for the survey of the living persons.

ANALYSIS OF DATA

Morphologic Variations in Living Persons • The delineation of roentgenograms of 70 condyles in the living persons, aged 20 to 30 years, revealed clearly the wide range of morphologic variations. It could hardly be said from the delineations (Fig. 5 and Table 1) that the two condyles in the same individual were exactly alike in shape and size. In Case 7 the general contour of the right condyle is similar to that of the left condyle and yet they are different in size.

Dimensional Variations in Living Persons • The data in Table 1 show the variations in dimensions of the condyles —in the length of the lateromedian axis, as well as in their width—not only in various individuals but also in the same individuals.

Only in two individuals (Cases 14 and 30) are the right condyles equal in length and width to those of the left side. On the other hand, the general contour is not precisely the same on both sides.

In eight individuals the right condyle is equal in its lateromedian axis to the left.

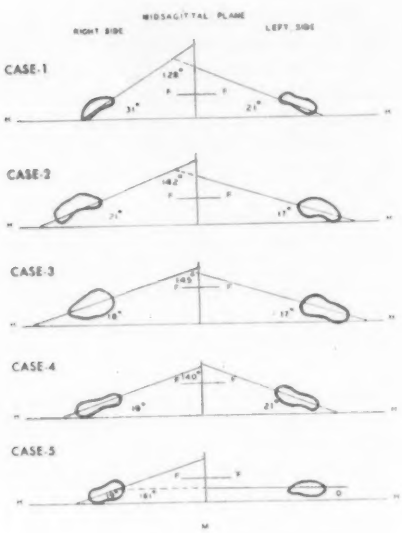
In nine individuals the width of the right condyle is equal to that on the left.

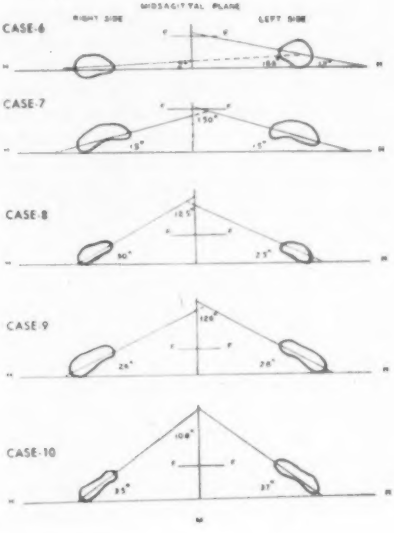
It is found that the average length of the lateromedian axes of the 70 condyles in this group is 2.2 cm. and the average width is 0.8 cm.

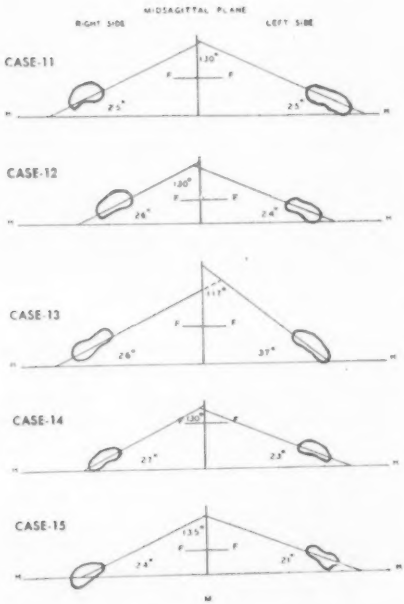
Variation of Inclinations • The position of both right and left condyles in the same individual displays a wealth of variations. Analyses of data in Tables 2 and 3 indicate that:

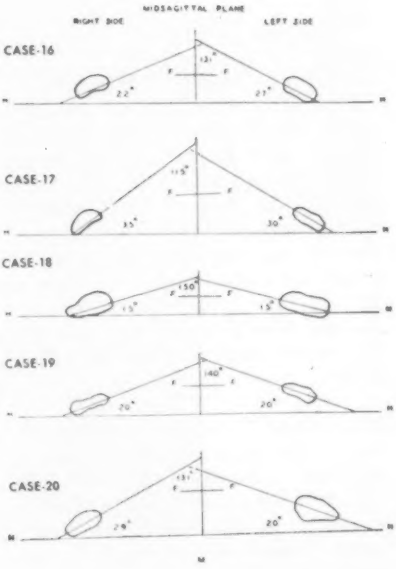
1. In five cases only, the condyle on one side has the same angulation with the horizontal plane as the condyle of the other side.
2. The range of variation in the angulation of the right and left condyles runs up to 19 degrees.
3. The extensions of the lateromedial axes of the condyles form an obtuse angle open to the front and vary from 110 degrees to 166 degrees.
4. The extensions of the lateromedian axes in 24 cases meet in variable locations in the foramen magnum. In 11 cases they meet in different locations outside the foramen magnum.

Analysis of Data Obtained in Study of Dry Specimens • The results of the combined photographic and roentgenographic study (Fig. 6) as well as firsthand observations of the 40 condyles (Table 4) reveal that the two condyles in the same dry specimen are not alike in size, form and position. Only in two mandibles (Specimens F and R) are the length and width of the right condyle equal to those of the left condyle. Yet both condyles varied in the other aspects.


MIDSAGITTAL PLANE
RIGHT SIDE
LEFT SIDE
CASE-1
128°
31°
21°
CASE-2
142°
21°
17°
CASE-3
145°
18°
17°
CASE-4
140°
18°
21°
CASE-5
M


MIDSAGITTAL PLANE
RIGHT SIDE
LEFT SIDE
CASE-6
CASE-7
150°
15°
15°
CASE-8
185°
30°
25°
CASE-9
128°
26°
26°
CASE-10
108°
35°
37°
M


MIDSAGITTAL PLANE
RIGHT SIDE
LEFT SIDE
CASE-11
130°
25°
25°
CASE-12
130°
26°
24°
CASE-13
117°
26°
37°
CASE-14
130°
23°
23°
CASE-15
135°
24°
21°
M


MIDSAGITTAL PLANE
RIGHT SIDE
LEFT SIDE
CASE-16
131°
22°
23°
CASE-17
115°
35°
30°
CASE-18
150°
15°
15°
CASE-19
140°
20°
20°
CASE-20
131°
20°
20°
M

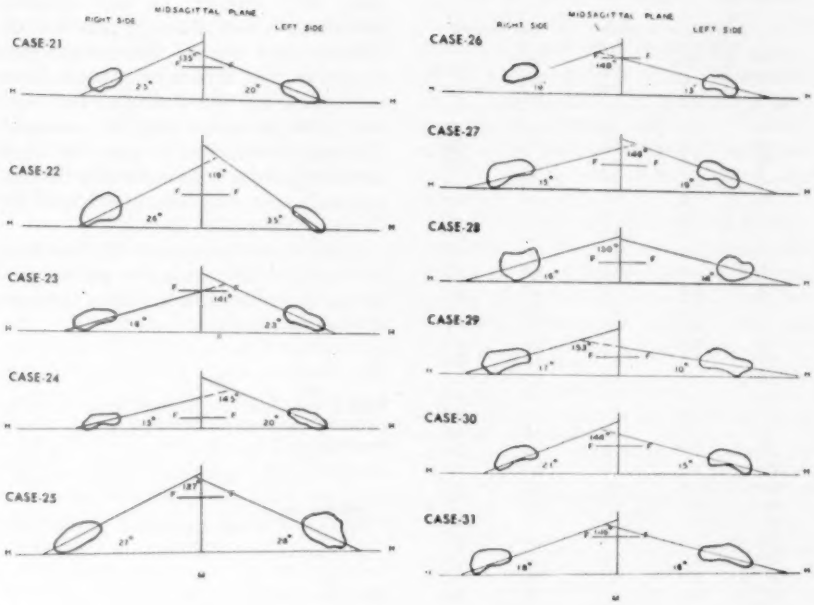


Fig. 5 • Tracings of roentgenograms showing variations in condyles of 35 living persons

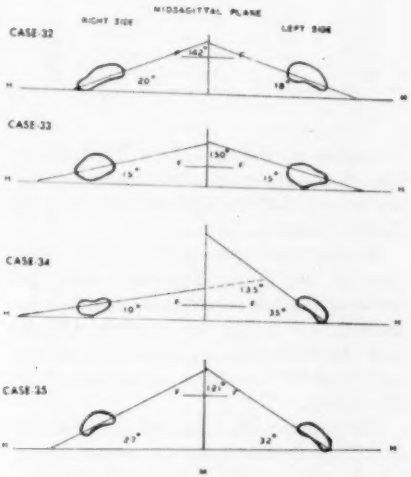


Table 1 • Data obtained by tracing roentgenograms of condyles of living persons

Case number	Right capitulum		Left capitulum	
	Long axis (cm.)	Width (cm.)	Long axis (cm.)	Width (cm.)
1	1.9	0.5	2.0	0.5
2	2.5	0.7	2.3	0.8
3	2.5	1.1	2.4	0.9
4	2.5	0.5	2.4	0.8
5	1.9	0.7	2.0	0.8
6	2.2	1.2	1.8	1.5
7	3.0	0.8	2.7	0.9
8	1.9	0.7	1.9	0.8
9	2.6	0.9	2.7	0.7
10	2.4	0.6	2.8	0.7
11	2.0	0.7	2.6	0.9
12	2.0	0.9	1.9	0.7
13	2.0	0.7	2.4	0.9
14	1.8	0.7	1.8	0.7
15	1.9	1.0	1.9	0.6
16	1.9	0.7	1.9	0.9
17	1.8	0.7	1.9	0.7
18	2.5	1.1	2.6	1.0
19	2.1	0.6	1.9	0.6
20	2.1	1.0	2.4	1.2
21	1.8	0.9	2.0	1.0
22	2.3	1.2	2.0	0.7
23	2.4	0.8	2.3	0.7
24	2.1	0.5	2.2	0.7
25	2.7	1.1	2.6	1.5
26	1.8	0.6	1.8	0.7
27	2.6	0.8	2.2	0.8
28	2.1	1.3	1.9	1.2
29	2.5	0.9	2.7	0.9
30	2.3	0.7	2.3	0.7
31	2.2	0.8	2.8	0.9
32	2.5	0.8	2.2	0.8
33	2.0	1.2	2.1	1.0
34	1.6	0.6	1.7	0.5
35	1.8	0.6	1.9	0.6

Variation of Inclinations • The following observations are the results of the analysis of data which are presented in Tables 5 and 6.

In only two specimens has the right condyle the same angulation with the horizontal plane (perpendicular to the midsagittal) as the left condyle. Otherwise the difference in angulation of the right and left condyles varies from 0 to 22 degrees.

The lateromedian axes of the condyles in 19 specimens form an obtuse angle which varies from 112 degrees to 159 degrees with an average of 136 degrees.

In Specimen V, the two axes do not meet in their lateromedial extensions, since they diverge. In this specimen everything is normal except that the condyle is tilted toward the midline and downward and stands on a much lower level than the left condyle. The right and left bodies of the mandible are equal. The only exception is that the right ascending ramus is tilted toward the outside indicating that the right side of the face was wider than the left.

Comparative analysis of the data from the survey of dry specimens and the survey of living persons indicates they are in close agreement.

Table 2 • Relationship of condyles. Data obtained by measuring the inclinations of the lateromedian axes of the condyles

Case number	Angulation of the long axes of condyles with horizontal plane	
	Right capitulum (degrees)	Left capitulum (degrees)
1	31	21
2	21	17
3	18	17
4	19	21
5	19	0
6	2	12
7	15	15
8	30	25
9	26	28
10	35	37
11	25	25
12	25	24
13	26	37
14	27	23
15	24	21
16	22	27
17	35	30
18	15	15
19	20	20
20	29	20
21	25	20
22	26	35
23	16	23
24	15	20
25	27	26
26	19	13
27	15	19
28	16	14
29	17	10
30	21	15
31	18	16
32	20	18
33	15	15
34	10	35
35	27	32

COMMENT

In discussing the results of this study in relation to those of previous investigations, here are two observations that can be mentioned. In the first place, in many human anatomy textbooks and other publications, the discussion of variations of the condyles in the same normal individual is too general.

In the second place, studies of the condyloid process from the surgical point of view have been made mostly through evidence and interpretation of lateral projections. A lateral projection is often relied on when comparison is made of the appearance of the right condyle with that of the left. The normal differences between the two condyles in length and width, in the same individual, make such interpretations misleading and diagnosis and treatment planning based on these projections alone may be subject to great error.

The results of this study are in accord in general with those of previous investigators. The right and left condyles in the same normal individual present a wealth of variations in size, width and length, and position.

It is stated by some authors[1,9,12] with regard to the lateromedian axes of both condyles that their extensions would meet near the anterior margin of the foramen magnum. The results of this study indicate that this statement is not always true. Another author[10] makes two contradictory statements with regard to the meeting of the axes in some part of the foramen magnum.

In this study it was found that the lateromedial axes of the condyles, if extended, may meet within the foramen magnum but there can be no definite rule for the location of their intersection.

The only report[11] on the obtuse angle formed by the axes of the condyles indicates that this angle is from 150 degrees to 160 degrees.

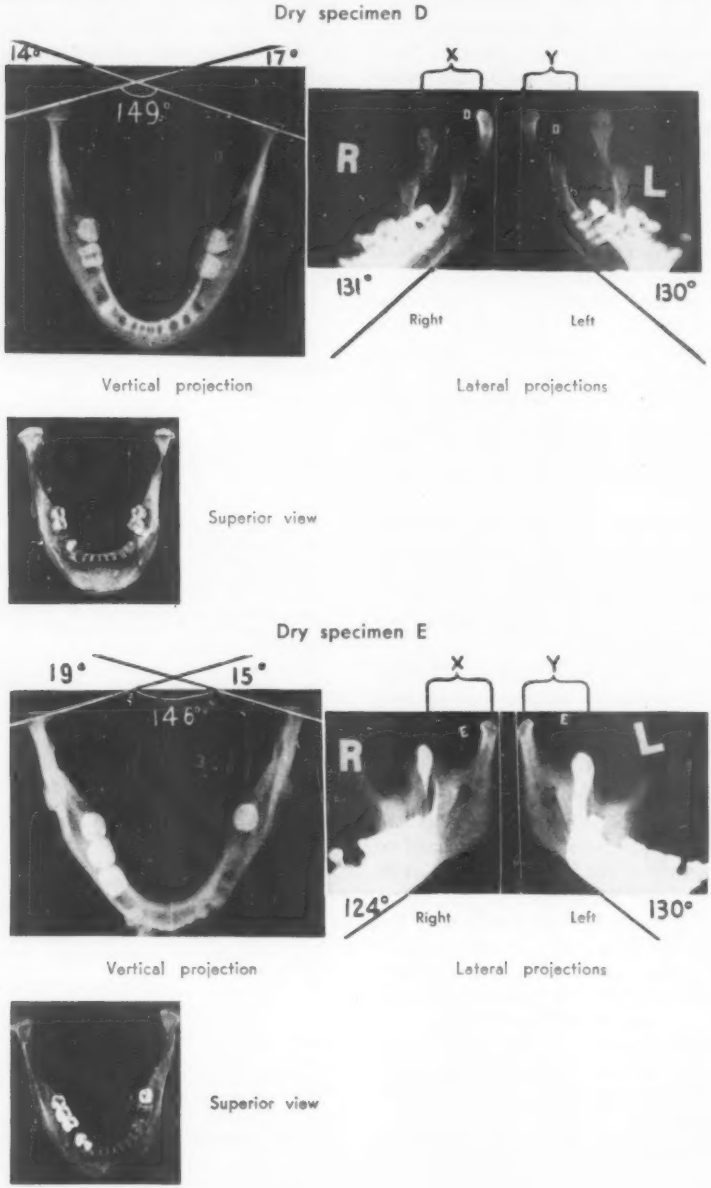
The results of this study indicate a wider range in the variation of the angle formed by the lateromedial axes of the condyles. In the study of living persons presented in this investigation, the obtuse angle is found to vary from 109 degrees to 166 degrees with an average of 138 degrees. This obtuse angle in a variety of dry specimens varied from 108 degrees to 159 degrees with an average of 135 degrees.

The average length and width estimated in the study of 110 condyles presented in this investigation are 2.1 cm. for the lateromedial axis and 0.75 cm. for the width. This result is in accord with the results of previous investigations.

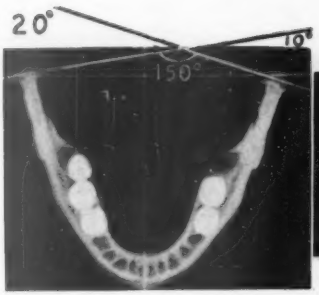
Table 3 • Data obtained by tracing roentgenograms of condyle of living persons

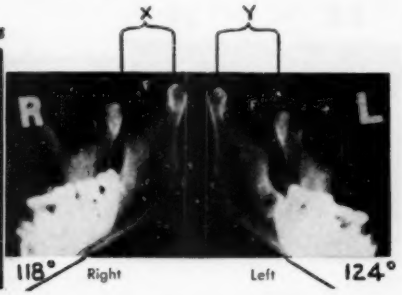
Case number	Location where extension of both axes meet	Angle formed by intersection of extensions of long axes (degrees)
1	Inside foramen magnum	129
2	Inside foramen magnum	143
3	Inside foramen magnum	141
4	Inside foramen magnum	140
5	Outside foramen magnum	161
6	Outside foramen magnum	166
7	Just in front foramen magnum	151
8	Inside foramen magnum	127
9	Inside foramen magnum	126
10	Inside foramen magnum	109
11	Inside foramen magnum	131
12	Outside foramen magnum	133
13	Outside foramen magnum	118
14	Inside foramen magnum	131
15	Inside foramen magnum	136
16	Inside foramen magnum	132
17	Outside foramen magnum	110
18	Inside foramen magnum	150
19	Inside foramen magnum	140
20	Inside foramen magnum	131
21	Outside foramen magnum	136
22	Outside foramen magnum	119
23	Outside foramen magnum	141
24	Inside foramen magnum	145
25	Inside foramen magnum	130
26	Inside foramen magnum	148
27	Inside foramen magnum	147
28	Outside foramen magnum	156
29	Inside foramen magnum	155
30	Inside foramen magnum	146
31	Inside foramen magnum	147
32	Inside foramen magnum	143
33	Inside foramen magnum	150
34	Outside foramen magnum	135
35	Inside foramen magnum	122

Fig. 6 • Roentgenographic and photographic survey showing variations in angle, size and shape of condyloid process of right and left side of same mandible. X and Y in the lateral projections demonstrate variable distance between the condyloid and coronoid processes on the right and left sides



Dry specimen F



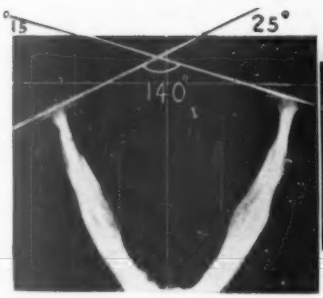


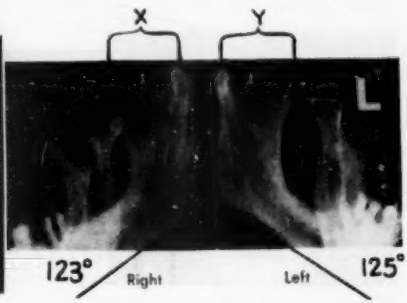
Vertical projection

Lateral projections

Superior view

Dry specimen I



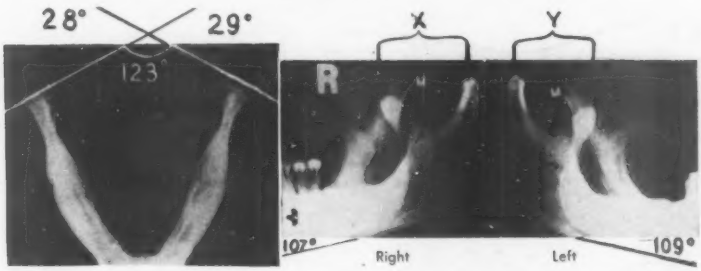


Vertical projection

Lateral projections

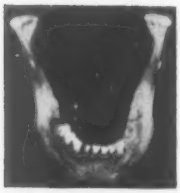
Superior view

Dry specimen M



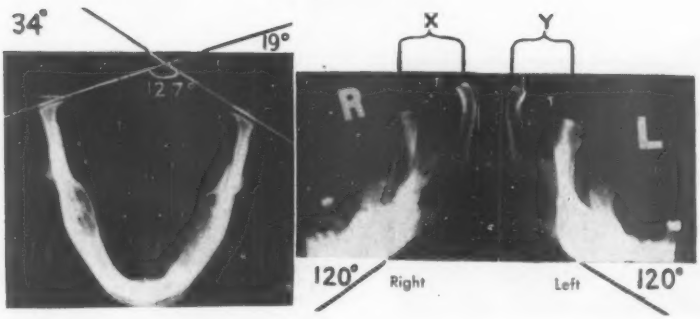
Vertical projection

Lateral projections



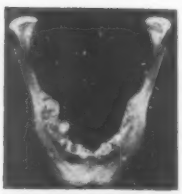
Superior view

Dry specimen T

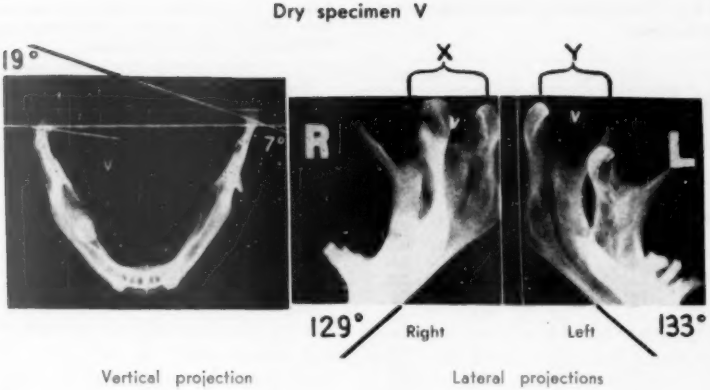


Vertical projection

Lateral projections



Superior view



Superior view

SUMMARY AND CONCLUSIONS

From the surgical point of view a basic knowledge of the normal variations of the condyle in various individuals and in the same individual is of great importance. The oral surgeon's diagnosis of the temporomandibular joint is based mainly on his preconceived idea of normality. In differential diagnosis it is necessary to visualize the temporomandibular joint in the wide range of its normal variations.

The roentgenologic examination of the condyloid process necessarily is difficult because of its relationship to the other osseous structures of the skull. In the lateral projection of this structure it has been shown that, by using the same technic as used in practical cases, it is possible for one to be led astray in the interpretation of the roentgenogram, particularly in regard to the relationship of the condyle to normal anatomic structures. Also it is shown that when the roentgenograms indicate a great variation in the condyles on the left and right sides of the same individual, in the majority of cases the variation in size and form of the condyle is within the normal range. Moreover the variation which causes difficulty in interpretation is more often due to normal variation than to distortion caused by inaccurate or improper angulation.

It is also essential from a surgical point of view that the lateromedian dimensions of the condyle should be known. In order to do this a simple technic has been devised, which, if followed, will give the operator an opportunity to measure the variation in lateromedian angulation with the midsagittal plane. It will also present a view of the condyle which is advantageous to the operator when performing any surgery in that region; in

Table 4 • Data obtained by first hand observations of 20 dry specimens

Specimen	Right capitulum		Left capitulum	
	Long axis (cm.)	Width (cm.)	Long axis (cm.)	Width (cm.)
A	2.4	1.4	2.2	1.2
B	2.3	0.4	2.3	0.6
C	2.1	0.7	2.2	0.6
D	1.9	0.7	1.5	0.8
E	1.7	0.8	1.6	0.7
F	2.0	0.8	2.0	0.8
G	2.6	1.1	2.4	0.8
H	1.8	0.6	1.9	0.9
I	2.3	0.7	2.5	0.6
J	2.3	0.8	2.2	0.7
K	1.7	0.7	1.8	0.5
M	2.2	0.7	2.1	0.8
O	2.2	0.7	2.3	0.8
P	2.3	0.6	2.2	0.7
Q	1.8	1.0	2.1	0.9
R	1.9	0.7	1.9	0.8
S	2.2	0.5	2.3	0.8
T	2.2	0.6	2.0	0.8
U	1.8	0.6	1.9	0.7
V	1.7	0.8	1.9	0.8

Table 5 • Relationship of condyles in dry specimens. Data obtained by measuring the inclinations of the lateromedian axes of the condyles

Specimen	Angulation of the long axes of condyles with horizontal plane	
	Right capitulum (degrees)	Left capitulum (degrees)
A	28	17
B	15	22
C	20	20
D	17	14
E	15	19
F	10	20
G	13	8
H	40	18
I	25	15
J	20	15
K	35	33
M	29	28
O	21	18
P	28	23
Q	20	16
R	30	20
S	18	15
T	19	34
U	35	37
V	19	—7

Table 6 • Data obtained by roentgenographic survey of the 20 dry specimens

Specimen	Angulation formed by intersection of long axes (degrees)
A	135
B	143
C	140
D	149
E	146
F	150
G	159
H	112
I	140
J	145
K	112
M	123
O	141
P	129
Q	144
R	130
S	147
T	127
U	108
V	Axes do not intersect medially

particular, it will show the relation of the condition to the structures at the base of the skull.

The technic devised can be known as "submento-occlusal technic" which is a variation of the submentovortex. The points of great importance are that the plane of occlusion must be perpendicular to the floor and parallel to the film, and that the central rays pass through the midsagittal plane.

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Electron microscopy of enamel and dentin

Sol Bernick, M.S.; R. F. Baker,† Ph.D.; R. L. Rutherford,‡ Ph.D., and O. Warren,§ B.S., Los Angeles*

The application of the electron microscope to the study of dental tissues has been limited up to the present time to interpretation of specimens derived mainly from the use of the replica technic. Detailed histologic studies with the electron microscope could not be undertaken until an acceptable method was developed for the preparation of ultrathin sections of 0.05 micra or less. Pease and Baker[1,2] developed a technic for sectioning soft tissue to this thickness. In the present investigation their method was applied to dentin and enamel.

Since 1944 the use of the replica method has been attempted by a few investigators. Richards and Thomassen[3] described the replica method for dental tissues and demonstrated micrographs of enamel and dentin. Gerould[4,5] also described a technic for replica studies and compared the micrographs of normal enamel and dentin with fluorosed enamel and dentin. He found that the fluorosed teeth exhibited finer detail than did normal teeth. Boyle, Hillier and Davidson[6] studied the crystalline characteristics of enamel by crushing immature enamel on a watch glass. Micrographs revealed that the prisms contained multitudes of enamel crystallites aligned along a single axis. Scott and Wyckoff,[7,8,9] in their replica studies, found that the rod sheath seemed to be the most completely calcified structure of the enamel and the enamel interprismatic substance appeared to have a higher content of mineral salts than the rod itself. Micrographs of dentin revealed three types of fibers—in the dentinal tubule a thin-walled dentinal fiber, in the matrix the characteristic collagen fibril (cross bar striations spaced at 640 angstrom units) and also a very fine fiber of unknown character.

Pease[10] made a preliminary report of his attempts to obtain satisfactory ultra-

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§Research associate of experimental medicine, School of Medicine, University of Southern California.

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2. Pease, D. C., and Baker, R. F. The fine structure of mammalian skeletal muscles. Am. J. Anat. 84:175 (March) 1949.

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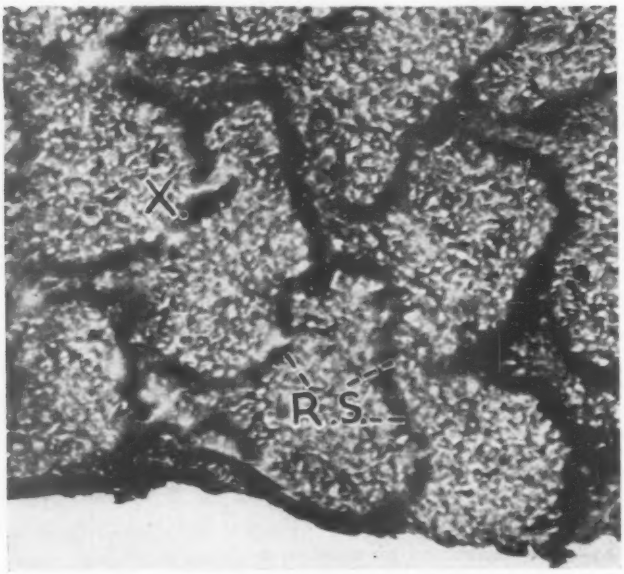


Fig. 1 • Cross-section view of immature enamel. Note irregularity in size and shape of enamel rods. R.S., rod sheath; X, breaks in rod sheaths. ×15,000

thin sections of decalcified rat's teeth, and emphasized the technical problems of sectioning. He noted minute cavities in the fibrous matrix, and the lack of fibrous structure in the pulp.

MATERIAL AND METHODS

Unerupted incisors and cuspids from the mandible and maxilla of a six month old infant, obtained at autopsy, were used for the study of the enamel. The mandible and maxilla were fixed in an alcoholic solution of Bouin's fixative for at least three days and then were cut into blocks, each of which contained one tooth.

For the study of dentin, 15 noncarious teeth were collected from patients at the surgery clinic of the School of Dentistry, University of Southern California. The tips of the roots were clipped off immediately after extraction. This allowed faster penetration by the fixative which was a 2 per cent osmic acid in Zenker's solution. The teeth were kept in the fixative for 24 hours.

The procedure from this point on was similar for both enamel and dentin. The materials were decalcified in 10 per cent nitric acid in Formalin and prepared for sectioning by the paraffin nitrocellulose method. The material was embedded in 50 per cent nitrocellulose, hardened in chloroform, and infiltrated with 65°C. paraffin. The blocks were about 1 mm. square. Sections of 0.05 micra were obtained using the modified microtome as described by Pease and Baker.[1,2]

Enamel • Enamel as seen under the light microscope is composed of enamel rods (prisms), rod sheaths, and a cementing interprismatic substance. The rod is usually described as an irregular five or six sided prism that passes from the dentinoenamel junction to the external surface. In cross section the outline of the rods as seen in the electron microscope shows great irregularity (Fig. 1).

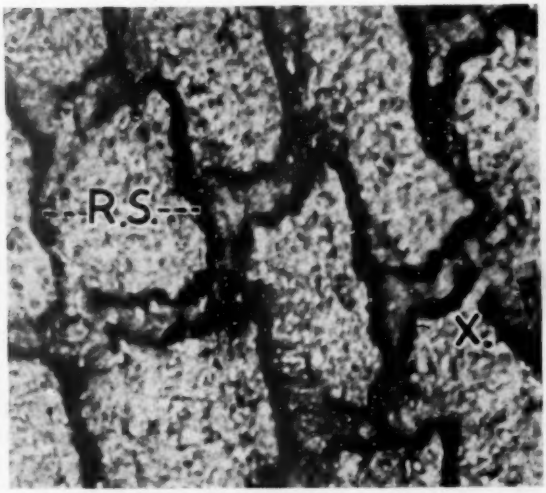


Fig. 2 • Oblique view of enamel. Note processes of individual rods that project between adjoining rods. R.-S., rod sheaths; X, breaks in rod sheath. ×15,000

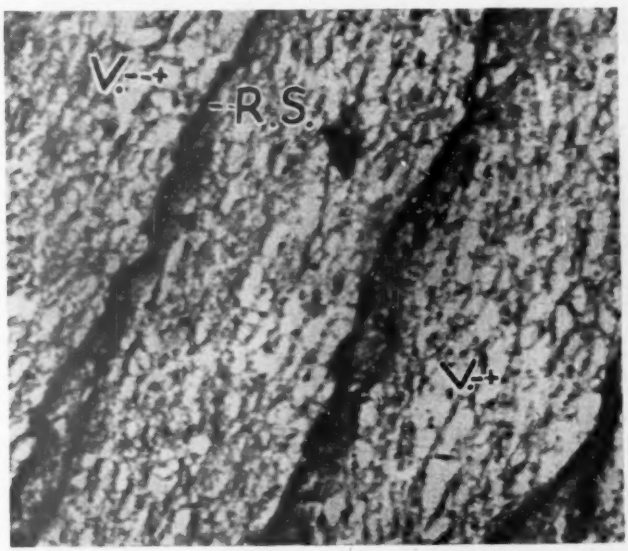


Fig. 3 • Longitudinal section of immature enamel. Note lack of cementing interprismatic substance between rods and the presence of vacuoles in prism proper. R.S., rod sheath; V, vacuoles which represent space where minerals were present before decalcification of enamel. ×15,000

In addition certain rods have processes that project in between adjoining rods (Fig. 1). This irregularity may be explained by the following hypothesis outlined by Orban.[11] The calcification of each rod begins close to its surface and proceeds toward the center. In addition

11. Orban, B. Oral histology and embryology. St. Louis, C. V. Mosby Co., 1949, p. 53.

the calcification does not occur on the entire periphery of the rod at the same time but begins on one side. Consequently one side of the rod hardens sooner than the other and in the calcification, which seems to be accompanied by increased pressure, the harder side of the rod presses into the softer side of the adjacent rods, compressing them and leaving a permanent impression.

The content of the rods is not homogeneous but consists of both an organic and inorganic component, and in the micrographs studied the inorganic substance is represented by vacuoles (Fig. 1, 2, 3). These vacuoles are due to the removal of the minerals in the process of decalcification. They vary in size and shape and show no regular orientation in the rod. These vacuoles probably are aggregates of crystals, the apatites, which are laid down in the calcification of the rod. Between these mineral aggregates there remains an organic residue which appears reticular in nature and is distributed uniformly throughout the rod.

At the periphery of each rod there is a definite organic sheath having a different density from the prism interior. In Figures 1 and 2 the sheaths of adjoining rods appear to be fused together giving the impression of a united sheath. The density of these sheaths is not uniform. In addition the sheath is not always continuous; there are breaks in the sheath at different points (Fig. 1, 2).

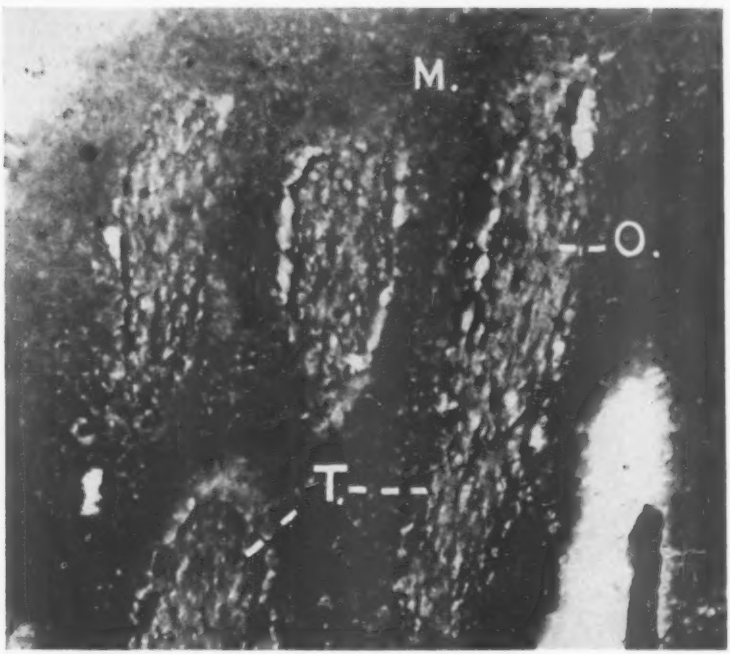


Fig. 4 • Longitudinal view of mature dentin. Note odontoblastic process filling the dentinal tubule without a sheath of Neumann being present. T, dentinal tubule; O, odontoblastic process; M, matrix. ×15,000

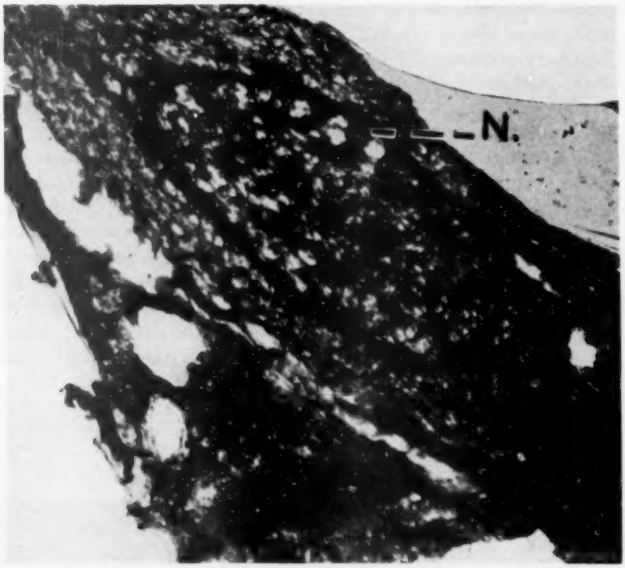


Fig. 5 • Isolated odontoblast. N, nucleus. ×20,000

At times these breaks are so pronounced that one rod appears to fuse with its neighbors.

When viewed through the light microscope the rods appear to be cemented together by an interprismatic substance which has a slightly higher refractive index than the rods. Micrographs of enamel failed to show this definite interprismatic substance. In both cross and longitudinal sections the rods appeared to be cemented together, not by an interprismatic substance but by the united rod sheaths (Fig. 1, 3). What is seen as the interprismatic substance in the light microscope probably are long processes of the rods that are compressed in the calcification.

Dentin • Dentin, as seen under the optical microscope, consists of a fibrillar calcified matrix in which are embedded the dentinal tubules containing the protoplasmic processes of the odontoblasts, designated as dentinal or Tomes's fibers. The dentinal tubule in cross section under the electron microscope appears as irregular channels with no definite border. The periphery of the tubule does not show the definite condensation, the so-called sheath of Neumann, which is seen under the optical microscope, on sections stained with hematoxylin and eosin. Instead the wall of the tubule consists of the matrix which has enveloped the protoplasmic extensions of the odontoblast during the process of dentinogenesis. The odontoblastic extensions completely fill the lumen of the tubule (Fig. 4). The structure of this substance is similar to that of the cytoplasm of the isolated odontoblasts (Fig. 5). There is no definite sheath or wall around the process. These processes, however, do show shrinkage in certain places due to the preparatory procedures. In Figure 6, which is a cross-section view of two tubules, there is a pulling away of the

process from the periphery, yet there are other areas which are still intact at the periphery without a line of separation. Because of the shrinkage, there are areas of different density which are the result of condensation of the protoplasm.

The matrix of the dentin is made up of a ground substance in which are embedded fibrils and minerals. The fibrils are the typical collagenous fibril (cross bar striations spaced at 640 angstrom units); however, the majority of these fibers are masked by the minerals and ground substance. Numerous vacuoles are present throughout the matrix. It is from these regions that minerals are deposited *in vitro*. These vacuoles are not equal in size and shape and were probably occupied by the calcospherites which are laid down in the process of dentinogenesis (Fig. 7).

COMMENT

In the discussion of electron microscopy studies of dental tissues, it is necessary to clarify the different factors that have an influence on the findings when ultrathin histologic sections and high magnification are used. Improper fixation has a profound effect on the soft and hard tissues of the tooth because of its unyielding calcium casing. To overcome this difficulty, the extracted teeth were split into blocks of about 1 to 2 mm. in size and were put immediately into the

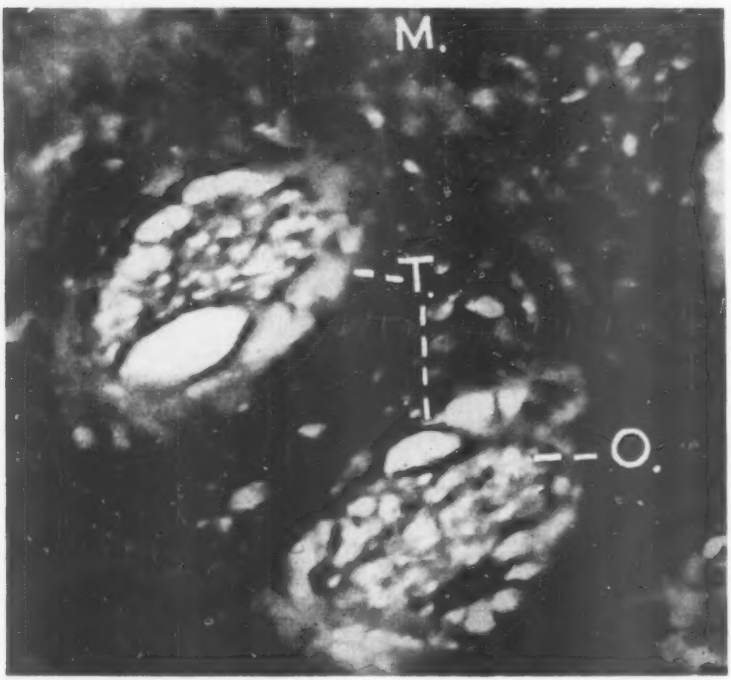


Fig. 6 • Cross-section view of dentin. T, dentinal tubule; O, odontoblastic process; M, matrix. ×20,000

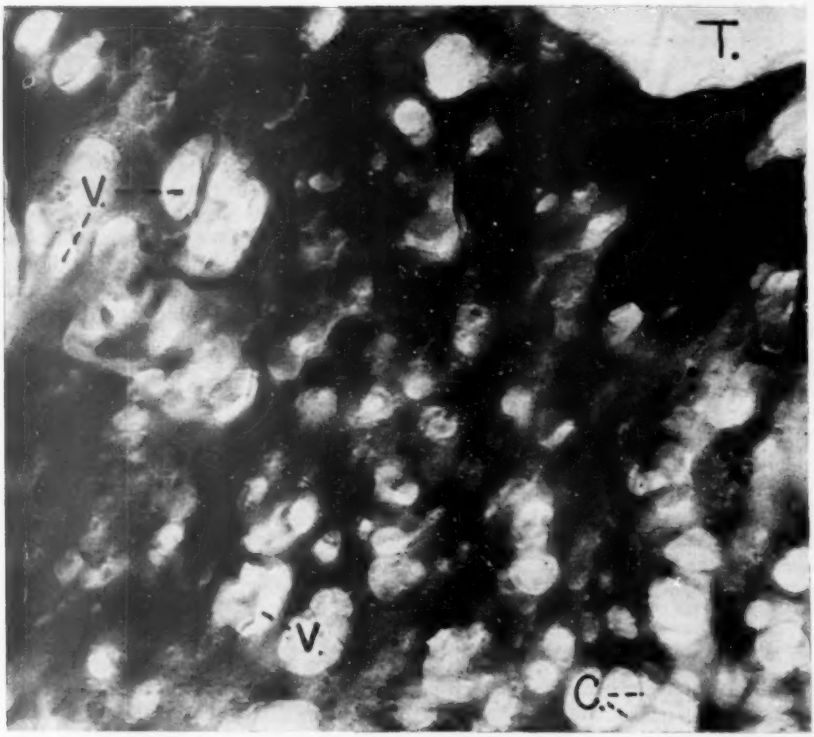


Fig. 7 • Cross-section view of dentinal matrix. Note irregular vacuoles which represent decalcified minerals; also suggestion of collagen fibrils are visible. T, dentinal tubules; V, vacuoles; C, collagen fibrils. ×15,000

fixative. The type of fixative is important and, for the electron microscope studies, it was found that osmic acid was most valuable since it precipitates the cytoplasm into finer granules than do other fixatives.

Every step in the preparation of the material may alter the original dimensions of the hard tissues. It is not unlikely that decalcification often alters the normal architecture; however, it was found that nitric acid, although a harsh mineral acid, gives the best results. Its action is rapid; thus the tissues are subjected to its effect for a minimum time. In the present study the vacuoles seen in the enamel and dentin are probably aggregates of minerals. Their original shape and size are altered slightly due to the acid. Inadequate decalcification also changes the arrangement of the organic and inorganic constituents; consequently, as Pease reported, sectioning is made difficult. In addition, the relationship of the fibrils and tubules in the dentinal matrix is masked because of the difficulty of getting thin sections. Proper decalcification allows the cutting

of hard tissue so that sufficiently thin ribbons are obtained, and the relationship of fibrils, minerals and tubules is visible.

Dehydrating agents, as well as methods of embedding, plus the factors mentioned earlier, cause shrinkage so that the dentinal fibers may be pulled away from the tubular walls. This shrinkage may lead to misinterpretation, as seen in the term "sheath of Neumann." Various definitions have been given for this term; as for example, a "sheath lining the tubule," or a "condensation around the tubular wall." With proper fixation and with the other factors kept at a minimum, the protoplasmic process of the odontoblast or dentinal fibers fill the dentinal tubules. The sheath or the condensations are artefacts caused by technical difficulties. Certainly one must be conservative in formulating conclusions from studies with the electron microscope, especially when the known histologic technics are used.

SUMMARY AND CONCLUSIONS

Detailed histological studies of dentin and enamel made with the electron microscope have been undertaken using ultrathin sections. Micrographs of enamel reveal that the enamel rod is very irregular in outline, having at times processes that project between adjoining rods.

These processes, when seen in the light microscope, usually are interpreted as being a cementing interprismatic substance. The cementing interprismatic substance is not demonstrated with the electron microscope. One finds a distinct organic network with inorganic components within the enamel core. A definite organic rod sheath is found circumscribing the rod proper. This sheath is not uniform in density; neither is it uniform in continuity.

Studies on dentin show that the odontoblastic process completely fills the dentinal tubule without a definite separating membrane. No sheath of Neumann is seen. The dentinal matrix consists of ground substance in which are embedded the typical collagenous fibrils (cross bar striations spaced at 640 angstrom units) and vacuoles representing the inorganic constituents that are lost in the preparation of the specimens.

Posture, Fatigue and the Dentist • Fatigue has a direct effect upon the health, efficiency, and production of all workers and especially older workers because of its cumulative effect. While it may be a product of poor nutrition resulting from social and psychological factors or pathological conditions, it may also be a product of poor posture and body mechanics, and numerous orthopedic ills accompanying age. *Winifred Devlin, "We Need the Older Worker—Let's Keep Him on the Job," Occupational Health 12:76, May, 1952.*

Cases and Comments

MANDIBULAR TRAUMATIC CYST

By Ath. P. Panagopoulos, D.D.S., Chicago

Though traumatic cysts of the mandible are not rare and many have already been mentioned in the literature, the following case may illustrate how the varied symptomatology may complicate a final diagnosis.

History • A 20-year-old sailor, with no past history of pain or trouble with his teeth, sustained a blow to the mental area during a football game about one year previously. Routine intraoral examination disclosed nothing abnormal. However, the roentgenogram revealed an oval radiolucent area about 2 cm. in length and 1 cm. in width in the region of the apexes of the lower central and lateral incisors. Since the pulps of all the teeth in this area were vital and the condition of the oral cavity normal, the attending surgeon diagnosed the condition clinically as an inflammatory change. Subsequently the patient was admitted to the Navy General Hospital in Pireaus, Greece.

An extraoral incision was made to facilitate drainage, and the periosteal surface of the bone was curetted. The cortical plate of the bone was not disturbed. The clinical progress of the patient was not satisfactory. A few days after the patient was admitted to the hospital he developed an extraoral fistula which drained onto the surface of the chin. After a month had passed, the original incision was reopened and the bone curetted again and an attempt was made to eradicate the fistula. In spite of this, two fistulae developed shortly thereafter (Fig. 1, left). The patient was then referred to the maxillofacial surgery department of the Red Cross Hospital in Athens, Greece.

Diagnosis • The examination of the oral cavity revealed teeth, gingivae, and oral mucosa to be normal. The lower anterior teeth were found to be vital when tested electrically. Caries was not present. Intraoral roentgenograms showed a radiolucent region over the apical fourth of the central incisors roots, and the occlusal roentgenogram (Fig. 1, right) showed the region to extend labially to the lateral incisors. These facts plus the history of a blow in the region led to a clinical diagnosis of a cyst of traumatic origin.

Treatment • As it was impossible to keep the two lower central incisors vital, pulpectomies were performed under local anesthesia. The root canals were filled and then an incision was made in the vestibule from cuspid to cuspid. The mucoperiosteum was reflected, exposing the bone, which had a bluish cast. This bone and the underlying loose edematous connective tissue with no apparent lining membrane were removed as a block leaving a cavity in the mandible. At the same time the apexes of the two central incisors were removed. After curettage of the fistulae tracts, and application of iodine, the wound was closed by suturing the soft tissues tightly into place.

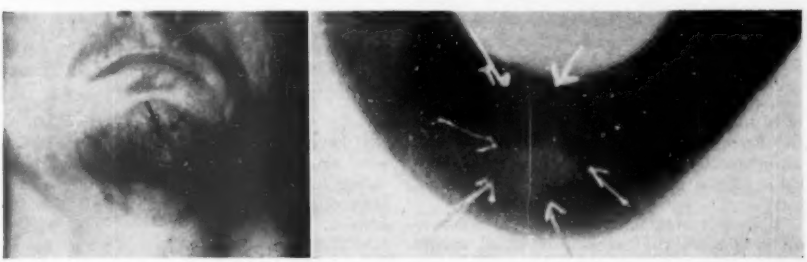


Fig. 1 • Left: Preoperative picture showing the extraoral fistulae of the mental symphysis area. Right: Preoperative occlusal roentgenogram, showing the radiolucent region extending mainly labially to the lateral incisors

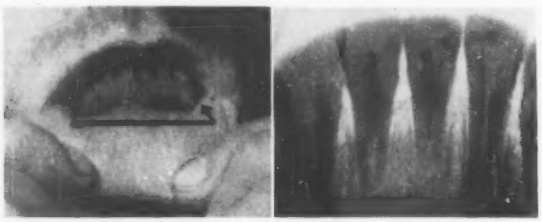


Fig. 2 • Left: Postoperative picture showing the complete healing of the intraoral structures soon after the operation. Right: Intraoral roentgenogram taken four years postoperatively, showing complete obliteration of the radiolucent zone, but partial resorption of the root canal filling material in both teeth

Histologic Findings • There was no lining membrane of connective tissue covering the bony cavity. The labial bony plate was very thin, showing some osteoclastic activity.

Postoperative Course • The healing was uneventful and rapid. Roentgenograms taken four years later showed complete obliteration of radiolucency, but partial resorption of the root canal filling material in both of the teeth (Fig. 2). The patient to date has had no local disturbance of any kind.

Summary • In this case a diagnosis of traumatic cyst of the mandible was made on the basis of the trauma experienced by the patient, his youth, the vitality of the teeth and the normality of the oral structures, the differential diagnosis from inflammatory diseases of the mandible and other types of cysts and the histologic findings.

Dental Clinic, Research and Education Hospital, University of Illinois

THIRD MOLAR TRANSPLANTATION

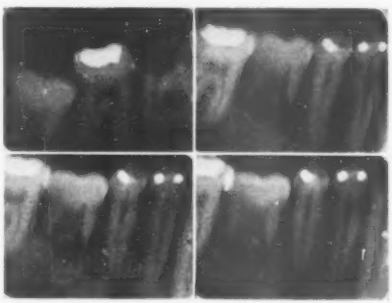
By Martin T. Siegel, D.D.S., Poughkeepsie, N. Y.

A boy, 13 years old, came to my office for routine examination. Roentgenograms showed that the mandibular first molar was nonvital and carious to the pulpal floor (see illustration, above left).

The age of the patient, as well as the position of the third molar and the width of the third molar crown in relation to the width of the first molar socket, were proper, and a transplantation was decided upon. The physical condition of the patient also was satisfactory.

A general anesthetic was used in order to insure a more copious flow of blood in the socket of the first molar. An intramuscular injection of 400,000 units of penicillin was given the day before and the day of operation. The first molar was removed *in toto* and the third molar bud was removed and inserted in the socket of the first molar. Care was taken not to injure the odontogenic sac of the third molar.

The operation was performed May 1, 1950. Roentgenograms were taken and the pulp was tested routinely until March 26, 1951 (see illustration). The tooth is firm in the socket and vital and the patient masticates his food properly.



Above left: Roentgenogram taken May 1, 1950. Above right: Taken Oct. 7, 1950. Below left: Taken Dec. 16, 1950. Below right: Taken March 26, 1951

I have performed four similar operations with equally good results. I feel that more transplantations should be performed and I hope other dentists will report their observations.

27 Cannon Street

COUNCIL ON FEDERAL DENTAL SERVICES

The military situation today

In discussion of the military situation today it is necessary, unfortunately, to deal in generalities at a time when dentists are especially interested in the particular. This must be done because the particular shifts so frequently that what is true today has lost its validity tomorrow. This report, therefore, will confine itself to the over-all situation.

Department of Defense studies made within the past few months indicate that there will be a need for about 7,000 dentists on active duty at all times between now and 1956. Since this many are already on active duty, the foreseeable need will be only for replacements. This number, roughly equivalent to a ratio of 1.9 dentists per thousand of troop strength, is subject to change with the international situation.

To meet these needs the Armed Forces will call to active duty about 2,500 dentists between December 1, 1952, and June 30, 1953. With the exception of a few persons in Priorities I and II who have been deferred but whose deferments will expire or be cancelled, all of this number will come from the Priority III group. Since there are nearly 15,000 dentists in Priority III, there will be no need for Priority IV calls during this period.

According to Selective Service regulations, members of the Priority III group are called in order of age, commencing with the youngest. Calls are made on a nationwide basis so that all persons aged 21 should, theoretically, be called before anyone aged 22. This however needs some explanation. First, Selective Service interprets this regulation to apply only to that group of persons classified I-A who have been given physical examinations and found qualified for military service. This automatically excludes from consideration for a particular call all persons who have been deferred for any reason and those persons who have been classified in I-A but who have not yet been given a physical examination, the results of which have been reported to the local board. Secondly, to fill a call for a given number of individuals, Selective Service determines how many persons it has available, how high into the age groups the call will reach, and then apportions a quota among the states based on the number each has in the affected group. On this basis it might be determined that to fill a given quota it would be necessary to call all men aged 21 through 25. States which had no men aged 25 or under would not be included in the call and some states which had more than their share of men aged 25 might receive a call for only half of them. On the whole, however, the requirements of the regulation to call in order of age would be met.

There are less than 1,400 dentists under age 36 in Priority III. This is a total figure which includes those who have been or may be deferred for any reason. In Priorities I and II, which include comparable age groups, the deferment

figures through August 31, 1952, were 24.6 per cent for Priority I and 34 per cent for Priority II. On this basis it is reasonable to assume that at least 25 per cent of the under 36 age group in Priority III will be subject to deferment. If this is true, then this group will be exhausted in the February requirements of the Armed Forces which will be for more than 750 persons, and some persons in the 36 to 40 age group will be subject to call at that time. Since many in this group were deferred for physical reasons in World War II, it is reasonable to expect that those between these ages who are physically qualified will be subject to call before the expiration of the draft law on June 30, 1953.

The House of Delegates, at the ninety-third annual session, committed the Association to continue its policy of supporting conscription of dental manpower. Specifically, it directed the Council on Legislation to support the extension of Public Law 779 unless a better proposal should be offered. It is, as yet, too early to predict what a new law might contain. The Association is, through its various Councils, studying the entire problem and is cooperating in the studies of the Department of Defense.

Although it is not possible to forecast the provisions of a new law it is certain that Congress will extend the authority of the government to conscript professional health personnel, probably until July 1, 1955. If this authority is granted, and the personnel strength requirement remains at 7,000, the Armed Forces will need 6,300 dental officers, not now in service, between July 1, 1953, and July 1, 1955. These will come out of the group now in Priority III and from graduates of the classes of 1953 and 1954 who are not veterans. If the Congress reduces the present age limit of 50 to 45, there will probably be no change in this estimate. If, however, it reduces it to 40, some persons in Priority IV with relatively little service may again be called to active duty. However, no definite information about this can be furnished now.

Many dentists write to the Central Office to inquire what they should do about accepting commissions in the Armed Forces. Obviously, if a dentist is liable for service in the near future he should apply for a commission without delay. If he is over 45, however, it would be well not to apply until Congress has had an opportunity to consider a new bill, since that law might change the situation. In any event there will be sufficient time to obtain a commission when this age group becomes more vulnerable. Dentists between 40 and 45 should likewise wait for a time as there does not appear to be immediate necessity for their services. Dentists under 40, however, should realistically face the probability that they will be called to service before July 1, 1953, and should govern themselves accordingly.

Commissions generally are granted on a basis of professional experience. Thus, dentists with less than four years of professional experience are initially commissioned as first lieutenants; those with less than 11 years of experience as captains; those with less than 18 years of professional experience as majors. The maximum age limits for these grades are 41, 44 and 49. In the Navy, commissions in the grade of commander or above must be approved by a Selection Board, and in the Army and Air Force, commissions of major or higher must be approved by the Adjutant General. It is probable that because of the pyramidal grade structure of the services that very few commissions above the grade of major or lieutenant commander will be issued.

The annual pay rates for married officers with less than two years' military experience including base pay, subsist-

ence, quarters and inducement pay are: first lieutenant, $5,944.32; captain, $6,847.68; major, $7,942.08 and lieutenant colonel, $9,036.48. For single officers, the annual rates in the corresponding grades are $5,739, $6,642, $7,636 and $8,626.

R. H. Friedrich, Chairman

BUREAU OF LIBRARY AND INDEXING SERVICE

Film Library staff meets with representatives of Chicago dental schools

In order to survey the visual materials available in dental schools, eliminate duplication of such materials, set up machinery for reviewing technical dental films and discuss the advisability of establishing in the Association Film Library a center for dissemination of pertinent information on audio-visual materials, a preliminary meeting was arranged in the spring by the Film Library staff with the approval of the three deans of the Chicago dental schools and their visual coordinators.

Lists of films and slides available for circulation by these schools and by the Association Film Library were exchanged. These schools also agreed to assist in reviewing technical films prior to their purchase by the Association Film Library. They also offered the Library the opportunity of reviewing their sets of slides for possible purchase and circulation.

This excellent cooperation has enabled the Association Film Library to proceed with the execution of the plans formulated at this meeting; namely, (1) film reviews are now appearing monthly in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION; (2) lists of films recently purchased have been prepared and are now being distributed, and (3) regular schedules for film screenings have been arranged.

The films on periodontics, reviewed in this issue, have been purchased recently by the American Dental Association Film Library and are available for loan. To this list can be added a film reviewed in the September issue of THE JOURNAL, "The Biologic Approach to the Periodontal Problem," by Abraham Berliner, D.D.S. All of these films can be utilized by dental schools, dental societies and study clubs. "Toothbrushing for the Periodontal Patient" also is valuable for the education of patients.

FILM REVIEWS

Periodontia • 16 mm., color, sound, 18 minutes. Produced in 1948 by the Department of the Navy, Bureau of Medicine and Surgery, Dental Corps, Washington, D. C. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11, and from the Department of the

Navy, Bureau of Medicine and Surgery, Dental Corps, Washington 25, D. C. Procurable for purchase ($85.97) from the United World Films, Inc., 1445 Park Ave., New York.

This film demonstrates all the steps involved in a gingivectomy. It opens with preparation of the patient for surgery and shows the armamentarium to be used. The depth of the pocket is the operator's guide for the depth of the incision which is made on both the labial or buccal and lingual sides. To control the bleeding, oxidized cellulose, which is later absorbed, is inserted. A pack combining mineral oil, eugenol and zinc oxide, is then placed on the area. At the second appointment, the pack is removed and the area cauterized with an escharotic solution. These treatments cover a period of four weeks. Postoperative instructions on oral hygiene are then given to the patient. This is a good teaching film. It is well organized and presented. The photography and lighting make all the intraoral activity clearly visible. This film is suitable for dental students, general practitioners, oral surgeons and periodontists.

Periodontal Surgery—Electrosurgical Gingivoplasty • 16 mm., color, silent, 925 feet, 25 minutes. Produced in 1950 by Levon M. Saghirian, D.D.S., in cooperation with Emerson R. Sausser, D.D.S., and Anthony W. Torre, D.D.S., Dental Department, Jefferson Medical College Hospital, Philadelphia. Photography is by J. Harold Williams, Jefferson Medical College. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11.

This film opens with a demonstration on animal tissue of the electrosurgical effects of cutting, coagulation, fulguration and sterilization. Dr. Saghirian explains that the depth of coagulation is controlled by the varying current intensities and thickness of electrodes. The operator then demonstrates his electrosurgical technic by performing a gingivectomy on a patient with a history of periodontal disease and a gingivotomy (author's terminology) on a patient with hyperplasia of the gingiva. Postoperative instructions are given to both patients. Preoperative and postoperative roentgenograms increase the instructional value of the film. This film is well organized and, although silent, the titles and legends make it self-explanatory. The photography and lighting enable the viewer to see very clearly all the intraoral activity. This is suitable for postgraduate teaching, for general practitioners, oral surgeons and periodontists.

Surgical Elimination of the Periodontal Pocket • 16 mm., color, silent, 1,500 feet, 60 minutes. Produced in 1951 by the California Academy of Periodontology. Oral surgery by A. W. Ward, D.D.S., assisted by Clarence E. Butler, D.D.S. Photography by Donald H. Miller, D.D.S. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11, and from the California Academy of Periodontology, 3798 Twenty-fifth St., San Francisco 10.

This film emphasizes the importance of the following procedures: (1) the use of interproximal curets to eradicate the most diseased tissue; (2) cauterization of freshly operated areas; (3) proper consistency, placement, and removal of the surgical pack; (4) postoperative use of interproximal stimulators, sponge rubber brush and prophylactic tape (for office use only). All of the steps of the operation are portrayed in detail which adds to the instructional value of the film. The close-ups, roentgenograms and legends make the film, although silent, self-explanatory. Postoperative photographs and roentgenograms at different intervals show the progress of the healing process. This film is well photographed and well presented. It is suitable for senior dental students, postgraduate dental students, oral surgeons, periodontists and general practitioners.

Toothbrushing for the Periodontal Patient • 16 mm., color, magnetic sound, 2 minutes, 650 feet. Produced in 1952 by the University of Minnesota School of Dentistry. Photography is by James H. Rothenberger. Demonstrated by Dorothea F. Radusch, D.D.S., M.S., and Helmut A. Zander, D.D.S., M.S. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago 11, and on loan or purchase from the University of Minnesota School of Dentistry, Minneapolis.

This film, which demonstrates a modified Charters' method for brushing teeth, opens by showing an attractive model brushing teeth incorrectly. It then demonstrates the manner of holding the brush for correct occlusal, labial, buccal and lingual brushing, and a method for brushing malaligned teeth. The film concludes by showing the improvement in a patient with periodontal disease after following these correct procedures. The photography is very good. All the intraoral sequences are clearly visible. The film is well organized and presented. The legends make it self-explanatory if it is used in its silent version. The magnetic sound adds to its value. This film is suitable for dental students, general practitioners and for the education of the patient.

COUNCIL ON DENTAL HEALTH

Third annual dental health conference

When the Council on Dental Health conducted its first one-day conference on October 28, 1950, the hope was expressed that such conferences would become annual events and that they would deal with more subjects of special interest to the majority of the participants.[1]

This hope has been realized in the two succeeding years. The Council conducted its third annual Dental Health Conference in St. Louis at the Jefferson Hotel September 6, 1952, prior to the American Dental Association's annual session. Specific subjects discussed were "The Postpayment Plan for Financing Dental Care," "Blue Shield Experience Applied to the Problem of Prepaid Dental Care," "Dental Care Under Blue Shield in Pennsylvania," "Prepayment Plan of Group Health Dental Insurance, Inc., in New York," "Current Status of Fluoridation Programs" and "A Review of Legal Problems Involved in Fluoridation."

The attendance of nearly 200 persons at the 1952 conference doubled that of the first conference. Among those present were individuals associated with local, district and state dental societies, the American Dental Hygienists' Association, city, county and state health departments, Washington, D. C., and regional offices of the United States Public Health Service, the Veterans Administration, the World Health Organization, the Labor Health Institute, dental school faculties, research foundations, state dental journals, city boards of education, public school dentists and a dental group practice. The geographical representation provided an additional aspect of interest, the participants coming from 41 states, the District of Columbia, Hawaii, Puerto Rico and Canada.

POSTPAYMENT PLANS

Ralph H. Campbell of Detroit, vice-chairman of the American Dental Association Section on Practice Management, said that, from the public health point of view, there is only one reason for a payment plan: to place dental services in the economic range of more people.

The Detroit Dental Society Postpayment Plan, which has been notably successful, was described by Dr. Campbell[2] in the August, 1952, issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

PREPAYMENT PLANS

To determine whether dental care is an insurable risk, Frank E. Smith of Chicago, director, Blue Shield Medical Care Plans, recommended consideration of the seven basic principles for a successful health insurance plan.[3] He emphasized that an enabling act for the operation of prepayment plans should be written into the law (insurance code) of the state.

Ray Cobaugh of Harrisburg, Pa., executive secretary of the Pennsylvania State Dental Society, discussed legislative action in regard to operation of prepayment plans in his state. The Pennsylvania law limited the providing of health services under Blue Shield to doctors of medicine. As a result, when a dentist who was a member of the staff of a hos-

1. American Dental Association, Council on Dental Health. Conference on community planning for dental health. J.A.D.A. 42:439 (April) 1951.

2. Campbell, Ralph H. Detroit postpayment plan. J.A.D.A. 45:139 (Aug.) 1952.

3. Dental health conference. News of dentistry. J.A.D.A. 45:495 (Oct.) 1952.

pital performed surgical operations described in the Blue Shield policy for a patient-subscriber, he could not be paid legally, and the patient was responsible for the fee.

The Pennsylvania dentists were successful in obtaining appropriate legislation to open participation in Blue Shield to their profession, and their experience can aid future groups both in what to do and what not to do. First, Mr. Cobaugh recommended that all parties involved be asked to help in working out the problem, that legislation be the last recourse. Another good rule, he said, was to retain counsel to draw up a bill. Further, a mechanical arrangement the group found desirable was the appointment of two members of the Pennsylvania State Dental Society as members of the Medical Service Association Corporation, which is the agency for Blue Shield in that state. For what not to do, he pointed to two mistakes made in Pennsylvania: the group did not allow enough time to make a decision on a plan of action before adjournment of the state legislature and it did not obtain sufficient knowledge of the exact situation of dentists in Pennsylvania hospitals. Consequently, the group had to survey the hospital dental situation after the bill was passed, which was on the last day of the legislative session, before the law could be put into operation.

John P. Looby, presenting the second phase of the experience in Pennsylvania, discussed the role of the dentist in Blue Shield in that state. To become a participating member of the Medical Service Association of Pennsylvania (MSAP), a dentist makes application and pays a $3 participation fee.

Following the passage of the enabling act of 1949 and the appointment of two dental members to MSAP, a fee schedule for oral surgery was voted by the hospital dental service committee of the Pennsylvania State Dental Society as a "beginning." The schedule, which was accepted by the Blue Shield fee committee and approved by the Insurance Commissioner of Pennsylvania, follows.

Alveolectomy:	
Area occupied by not less than six teeth*	$25.00
*Two or more partial areas of six teeth are classed as multiple operations at one and one half times minimum fee.	
Maxillary and mandibular	40.00
Dislocation—temporomandibular	25.00
Fistula, oral antrum, Plastic closure of	50.00
Impaction:	
Soft tissue	10.00
Partially covered by bone	25.00
Completely covered by bone	50.00
Limit for one hospitalization not to exceed $100. After removal of first impaction, the remaining impactions will be paid for at one half the rate.	
Mandibular fracture	50.00
Maxillary fracture	50.00
Removal of foreign body	50.00
Root resection	35.00
Sequestrum	50.00

Dr. Looby stated there were four major types of benefit agreements available to subscribers to Blue Shield in Pennsylvania: group surgical agreement, group medical-surgical agreement, nongroup agreement and "master steel agreement." For group enrollment, there is no age limit, no physical examination and no exclusion of benefits for known ailments or pre-existing conditions. Nongroup enrollment is limited to persons under 66 years of age who are in good health; no physical examination is required, but applicants must supply information concerning their health.

As a result of agreements concluded between a number of the steel corporations and the unions of the United Steelworkers of America (CIO), Dr. Looby explained, the steelworkers and members of their families were enrolled in the Pennsylvania and other Blue Shield plans throughout the nation. Membership costs are paid from the welfare funds of the steel companies and the unions, to which both management and employees contribute.

Because the "master steel contract" was signed in Pittsburgh with the Medical Service Association of Pennsylvania and because other Blue Shield corporations throughout the country do not have dentists participating, the problem of the acceptance of fees for dental services arose. Since both the unions and the steel companies insisted on a contract which would be the same for all parts of the country where the employees of the steel companies are located, it was necessary to restrict the terms of the contract as far as dental benefits were concerned. With the successful participation of the dentists in Pennsylvania in a complete service, as demonstrated in the fee schedule, Dr. Looby stated it was expected that the parties to this "master steel contract" would be willing to accept these benefits if all of the other Blue Shield organizations would allow the dentists to participate.

Available data, Dr. Looby concluded, demonstrate that the participation of dentists is quite acceptable in a Medical Service Association plan and that insurance for certain dental operations is actuarially possible if it is confined to inpatients in hospitals.

The major objective of the proposed plan of the First District Dental Society of New York is to place dental services within the economic reach of a large segment of the population, Bernard Clug of New York City, representing the Society, told the conference.

Under the plan, which would provide dental services in private dental offices, the patient would have a free choice of dentist, Dr. Clug explained, and the dentist would have the right to limit the number of patients he would accept. To be eligible, the patient would have to be a member of a low income family—$5,000 or less; the dentist could be any practitioner who is licensed in the state of New York and who maintains an adequately equipped office. The annual premium scale established two years ago was as follows: single person, $19.80; family of two, $39.60; family of three or more, $72. No registration fee would be paid by the dentist.

A fee schedule was established two years ago, closely approaching the Veterans Administration fee schedule at that time, and would now have to be revised. Because of objections that the schedule might set a precedent for charges to other patients, the fee schedule was prefaced by a statement including the explanation, "not to be confused with the normal fees charged other patients."

The plan would place dental care on a maintenance basis following rehabilitation of the patient's mouth. In the initial two-year period, during which a pilot study would be made, 25,000 patients and 7,000 dentists would participate. The plan has been held in abeyance because of the lack of underwriting funds, Dr. Clug explained.

Edwin T. Holmes of Fitchburg, Mass., presented a supplementary report of experience with the oral surgery prepayment plan in his state. Since 1950, the prepayment plan has been open to any dentist with operating privileges in a Massachusetts hospital.

Groups to be served by the plan were placed in two categories: service benefit members and indemnity benefit members. The former covers (1) low income groups—$2,500 or less for a family of two, $3,000 or less for three or more, and (2) middle income—$5,000 or less. The services are identical but the premiums are lower for (1) than for (2). The second category covers families of more than $5,000 income, and the fee schedule is subject to increase when the amount is less than the dentist would normally charge.

After the foregoing discussions on postpayment and prepayment plans, Dr. Carl F. Vohs of St. Louis, chairman of the medical service committee of the Missouri State Medical Association, presented comments on views of the speakers. Dr.

Vohs was of the opinion that the following question would have to be answered: Can the average American family be educated to pay $200 to $250 a year for complete health care coverage?

FLUORIDATION

W. Philip Phair, assistant secretary of the Council, reported that nearly 8,000,000 people in 367 United States communities were consuming fluoridated water as of August, 1952, according to a recent survey conducted by the Council. A complete report of the survey was published in the November, 1952, issue of THE JOURNAL.

The legal aspects involved in fluoridation were discussed by Francis J. Garvey, secretary of the Council on Legislation. Water supply is a proprietary function of city government that must be authorized by the state legislature, Mr. Garvey said. Since the city must have authority from the state before it can provide or contract for a municipal waterworks system, the state law and the city's own charter should be examined to ascertain exactly what the city's powers are with respect to the provision of water. If the law or charter is restrictive on this point, it must be revised. Mr. Garvey suggested an amendment at the state level broad enough to authorize any community to add fluorides to its water supply, thus forestalling any dispute at the municipal level on the grounds of lack of authority.

At the conclusion of the conference, Kenneth A. Easlick, member of the Council on Dental Health, summarized highlights of the program. David W. Brock, Council chairman, presided.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Survey of needs for dental care
I. Methodology and composition of sample

Dental needs, especially of school children, have often been measured in individual cities and counties. When these studies are compared, it is found that the prevalence of dental needs varies considerably from place to place. In some cases part of the variation is a result of differences in study methodology.

In an effort to obtain internally comparable statistics on dental needs for the entire United States and for all age groups, this Survey of Needs for Dental Care was begun in May, 1952. Without the generous cooperation of participating dentists, who were required to devote considerable time and effort to filling out the questionnaires, this survey would not have been possible.

Approximately 25,000 dentists, including both members and non-members of the Association, were sent postcard-size questionnaires (Fig. 1), of whom some 4,000 responded. Each dentist was asked to record the dental needs of ten con-

secutive patients beginning at noon of May 14. These definite instructions were given so that dentists would not consciously or unconsciously select or leave out certain types of patients. The total number of usable questionnaires returned was 39,678.

This survey is similar in purpose and method to one conducted by the Association in 1940, except that the earlier survey excluded children and information was obtained on only 7,541 patients. The two surveys will provide a basis for determining whether unmet dental needs have increased or decreased during the last 12 years.

One limitation of this survey should be borne in mind by anyone studying or using the results. This is a survey of dental patients. It does not include people who never go to the dentist. People who see a dentist infrequently are represented in smaller proportions than are people who see a dentist frequently. Therefore, the figures presented do not strictly describe the general population.

Tables will be presented, however, which will tend to overcome this limitation. For instance, dental needs will be analyzed according to length of time since the patient last saw a dentist. Needs also will be broken down according to income, age, sex and other factors. Thus it will be possible to compare the sample

Survey of Needs for Dental Care

DIRECTIONS: Fill in spaces with numbers according to dental needs of this patient, regardless of whether you will do the indicated work. For those operations or treatments which are not needed, enter a dash or a zero. Answers in the squares should be indicated with a √. Read accompanying instruction sheet.

A. Fillings needed
___ No. of teeth needing fillings
___ No. of fillings: one surface
___ No. of fillings: more than one surface

B. Extractions needed
___ No. because of decay
___ No. because of impaction
___ No. because of periodontal disease
___ No. solely because of prosthetic restoration
___ No. because of tooth fracture
___ No. because of other reasons
___ Total number

C. Crowns needed
___ No. of crowns

D. Fixed bridges needed
No. teeth to be replaced
___ First bridge
___ Second bridge
___ Third bridge
___ Fourth bridge

E. Removable bridges needed
No. teeth to be replaced
___ First bridge
___ Second bridge
___ Third bridge
___ Fourth bridge

F. Partial dentures needed
No. teeth to be replaced
___ First partial denture
___ Second partial denture

G. Complete dentures needed
☐ Upper (check if needed)
☐ Lower (check if needed)

H. Other needs
___ Periodontal treatment (no. of teeth)
___ Root canal treatment (no. of teeth)
___ Pulpotomy (no. of teeth)
___ No. of space maintainers
☐ Correction for malocclusion (check if needed)

I. Other treatment needed

☐ Check here if patient has no dental needs other than prophylaxis at this time

J. Other dental conditions
___ Total number of permanent teeth missing before extractions enumerated under B (exclouding third molars)
___ No. of these missing teeth previously replaced by bridges and dentures

K. Was x-ray used for this examination?
(67) 1 ☐ Full mouth
2 ☐ Less than full mouth
3 ☐ No x-ray

(Over)

OTHER INFORMATION ABOUT THIS PATIENT

Answers in the squares should be indicated with a √

(68) 1 ☐ Male
2 ☐ Female

(69) 1 ☐ White
2 ☐ Negro
3 ☐ Other

(70) 1 ☐ Married
2 ☐ Single
3 ☐ Widowed
4 ☐ Divorced

(71-72) Age ____

(73-74) No. in family ____

(75-76) Occupation ____
State ____

Size of city
(77) 1 ☐ Farm
2 ☐ Under 1,000
3 ☐ 1,000-2,500
4 ☐ 2,500-5,000
5 ☐ 5,000-10,000
6 ☐ 10,000-25,000
7 ☐ 25,000-50,000
8 ☐ 50,000-100,000
9 ☐ 100,000-250,000
10 ☐ 250,000-500,000
11 ☐ 500,000-1,000,000
12 ☐ Over 1,000,000

Approximate income (of family head if patient is a dependent)
(78) 1 ☐ $ -$ 999
2 ☐ 1,000- 1,999
3 ☐ 2,000- 2,999
4 ☐ 3,000- 3,999
5 ☐ 4,000- 4,999
6 ☐ 5,000- 5,999
7 ☐ 6,000- 7,999
8 ☐ 8,000- 9,999
9 ☐ 10,000 and up

Approximate length of time since last visit to a dentist
(79) 1 ☐ 1 to 14 days
2 ☐ 15 to 30 days
3 ☐ 31 days to 5 months
4 ☐ 6 to 11 months
5 ☐ 1 year
6 ☐ 1½ years
7 ☐ 2 years
8 ☐ 3 years
9 ☐ 4 years
10 ☐ More than 4 years
11 ☐ Never been to dentist before

How do you classify your practice?
(80) 1 ☐ General Practitioner
2 ☐ Specialist

If you are a specialist, mark one specialty below:
3 ☐ Oral Surgeon
4 ☐ Orthodontist
5 ☐ Pedodontist
6 ☐ Periodontist
7 ☐ Prosthodontist
8 ☐ Oral Pathologist
9 ☐ Public Health Dentist

Return to
AMERICAN DENTAL ASSOCIATION
Bureau of Economic Research and Statistics
222 East Superior Street, Chicago 11, Illinois

Fig. 1 • Questionnaire sent to approximately 25,000 dentists

Table 1 • Percentage distribution of population, 1950, and of patients in Survey of Needs for Dental Care, by region and by state

Region and state	Per cent of population	Number of patients	Per cent of patients
New England	**6.2**	**1,962**	**5.0**
Connecticut	1.3	447	1.2
Maine	0.6	316	0.8
Massachusetts	3.1	759	1.9
New Hampshire	0.4	122	0.3
Rhode Island	0.5	208	0.5
Vermont	0.3	110	0.3
Middle East	**23.7**	**9,665**	**24.4**
Delaware	0.2	40	0.1
District of Columbia	0.5	158	0.4
Maryland	1.6	787	2.0
New Jersey	3.2	1,313	3.3
New York	9.9	3,943	9.9
Pennsylvania	7.0	2,956	7.5
West Virginia	1.3	468	1.2
Southeast	**21.1**	**6,952**	**17.6**
Alabama	2.0	502	1.3
Arkansas	1.3	491	1.2
Florida	1.8	775	2.0
Georgia	2.3	808	2.0
Kentucky	2.0	866	2.2
Louisiana	1.8	467	1.2
Mississippi	1.4	381	1.0
North Carolina	2.7	794	2.0
South Carolina	1.4	400	1.0
Tennessee	2.2	688	1.7
Virginia	2.2	780	2.0
Southwest	**7.5**	**2,458**	**6.2**
Arizona	0.5	219	0.6
New Mexico	0.4	206	0.5
Oklahoma	1.5	555	1.4
Texas	5.1	1,478	3.7
Central	**26.5**	**11,696**	**29.6**
Illinois	5.8	2,357	6.0
Indiana	2.6	835	2.1
Iowa	1.7	854	2.2
Michigan	4.2	2,136	5.4
Minnesota	2.0	1,130	2.9
Missouri	2.6	969	2.4
Ohio	5.3	2,116	5.3
Wisconsin	2.3	1,299	3.3
Northwest	**5.3**	**2,672**	**6.7**
Colorado	0.9	482	1.2
Idaho	0.4	208	0.5
Kansas	1.2	385	1.0
Montana	0.4	211	0.5
Nebraska	0.9	375	0.9
North Dakota	0.4	311	0.8
South Dakota	0.4	244	0.6
Utah	0.5	378	1.0
Wyoming	0.2	78	0.2
Far West	**9.7**	**4,146**	**10.5**
California	7.0	2,877	7.3
Nevada	0.1	56	0.1
Oregon	1.0	611	1.6
Washington	1.6	602	1.5
Total	100.0	39,551	100.0

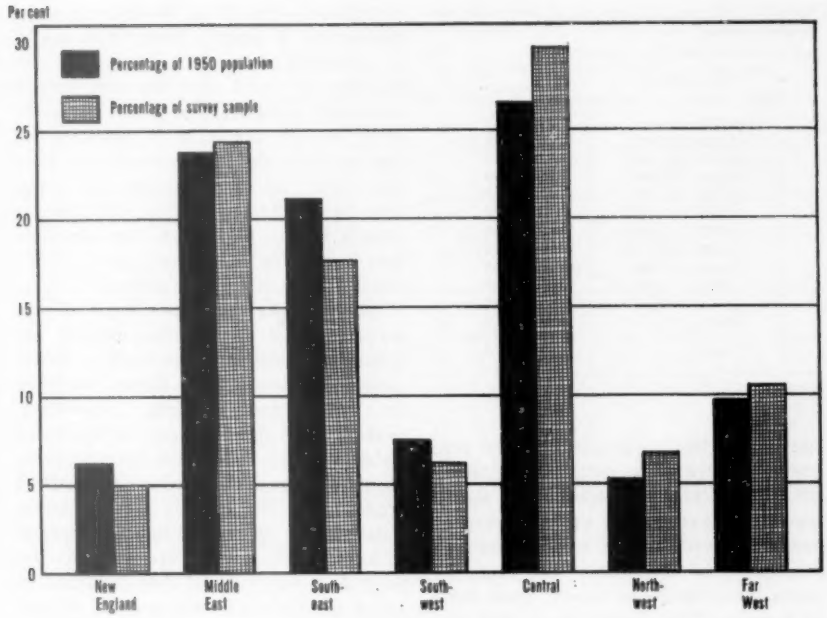


Fig. 2 • Comparison of regional distribution of 1950 population with regional distribution of patients included in Survey of Needs for Dental Care

with the population with respect to factors related to prevalence of dental needs.

The mailing of questionnaires was made on the basis of the population of the state rather than the number of dentists in the state. Thus, in the group of states with the highest dentist-population ratio, the mailing was made to only 25 per cent of the dentists. At the other extreme, in the state with the lowest dentist-population ratio the questionnaires were sent to all dentists. Thus it was possible to get the close geographic representation shown in Table 1 and Figure 2.

The distribution of dental patients according to size of city or town is shown in Table 2. Unfortunately, there is not available a closely comparable table for the general population. The Bureau of the Census, in its tables of this type, does not classify unincorporated places by size (Table 3). Of the 51 million people not classified by size of place, approximately 23.5 million live on farms, the remainder live in unincorporated places. Tables 2 and 3 are comparable, however, in the top four size-of-city categories, because no unincorporated places are involved. This comparison indicates a slight over-representation of dental patients in places over 100,000 population. This is to be expected from the fact that the dentist-population ratio is higher in larger places. It is also true that some dentists may have inadvertently recorded their own city size instead of their patient's.

Table 4 and Figure 3 show, by age and sex, the survey sample as a percent-

Table 2 • Percentage distribution of patients by size of city or town

Size of place	Per cent of patients
1,000,000 or more	12.7
500,000–1,000,000	7.6
250,000– 500,000	8.1
100,000– 250,000	8.8
50,000– 100,000	8.9
25,000– 50,000	8.9
10,000– 25,000	12.0
5,000– 10,000	9.0
2,500– 5,000	7.3
1,000– 2,500	5.8
Under 1,000	4.0
Farm	6.9
Total	100.0

age of the total population. These percentages have little meaning in themselves; they take on considerable significance, however, when used to compare age groups and sexes with respect to attendance at the dentist. For every 10 males included in the survey, there were 14 females. This agrees closely with the results of the 1950 Survey of the Dental Profession. The percentage of the male population aged 20 to 24 represented in the sample is sharply lower than might be expected from comparison with the number of males of other age groups and with females. The same phenomenon, though not quite so pronounced, was noted in the 1950 survey. It is possible that the large number of young men in the Armed Forces, who are included in the population age distribution but not in the survey, accounts for the deviation of this age group.

One item on the questionnaire was occupation of the patient. Many respondents recorded the occupation of the man of the house when filling out cards for wives and children. Therefore, women and children are excluded in Table 5, which shows how male patients 18 years of age and older were distributed according to the Bureau of the Census classification of occupations, compared with the male labor force in 1940. In general, it may be said that occupations which are highest on the scale of education, social standing and income are best represented among dental patients.

Table 3 • Percentage distribution of population by size of place, 1950

Size of place	Per cent of population
Urban territory	**64.0**
Places of 1,000,000 or more	11.5
Places of 500,000 to 1,000,000	6.1
Places of 250,000 to 500,000	5.5
Places of 100,000 to 250,000	6.3
Places of 50,000 to 100,000	5.9
Places of 25,000 to 50,000	5.8
Places of 10,000 to 25,000	7.9
Places of 5,000 to 10,000	5.4
Places of 2,500 to 5,000	4.3
Places under 2,500	0.4
Unincorporated parts of urbanized areas	4.9
Rural territory	**36.0**
Places of 1,000 to 2,500	4.3
Places under 1,000	2.7
Other rural territory	29.0
Total	100.0

Source: "1950 Census of Population, U. S. Summary," Series P-A1, Bureau of the Census.

Table 4 • Distribution of patients, and number of patients as percentage of 1950 population, by age and by sex

Age group	Male patients		Female patients	
	Number	Per cent of 1950 population	Number	Per cent of 1950 population
– 4	305	.0036	315	.0039
5– 9	1,485	.0208	1,595	.0233
10–14	1,673	.0290	1,859	.0333
15–19	1,657	.0310	2,010	.0382
20–24	968	.0164	2,363	.0404
25–29	1,454	.0241	2,571	.0414
30–34	1,581	.0283	2,635	.0445
35–39	1,561	.0291	2,329	.0414
40–44	1,287	.0259	1,793	.0351
45–49	1,080	.0237	1,552	.0332
50–54	946	.0232	1,284	.0308
55–59	769	.0209	906	.0242
60–64	541	.0175	726	.0232
65–69	345	.0153	455	.0193
70–74	210	.0135	210	.0122
75–	120	.0072	156	.0076
Total	15,982	.0212	22,759	.0298

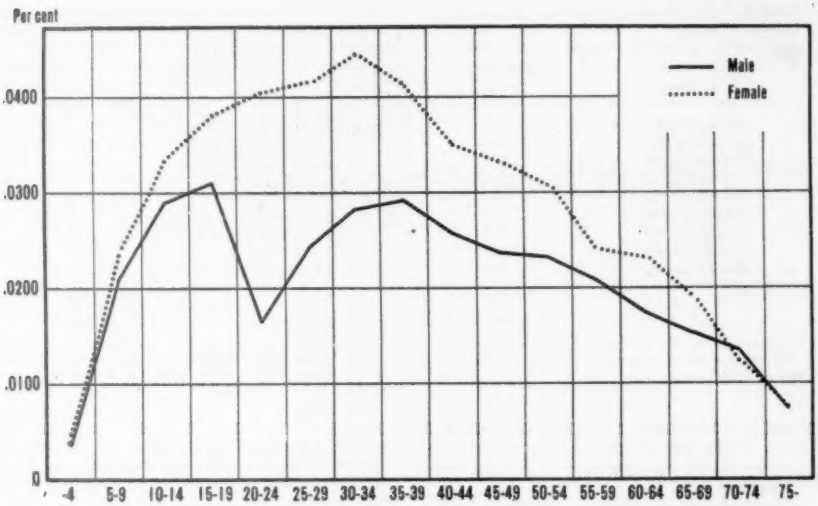


Fig. 3 • Percentage of 1950 population included in Survey of Needs for Dental Care, by age and sex

This is borne out by Table 6, which shows how all patients were distributed according to income as estimated by the dentist. It should be noted, however, that the income classification is possibly the least reliable of all the data on the questionnaires. Obviously a dentist is loathe to inquire about a patient's income. There are various bases on which the dentist can estimate income, as he was asked to do, but some of these indicators can be misleading.

The 1950 income of the population in general is presented in Table 7. In comparing these figures with the income of dental patients, it should be borne in mind that income has increased at least 10 per cent since 1950.

The distribution of patients according to length of time since last visit to the dentist is presented in Table 8. In line with the finding that there are more women than men in a random group of dental patients, this table shows that the average woman last saw her dentist at a more recent date than the average man. Table 9 gives the results of a poll con-

Table 5 • Percentage distribution of males in labor force and of male patients 18 years of age and older, in Survey of Needs for Dental Care, by occupational group

Occupational group	Per cent of male labor force*	Per cent of male patients
Professional and semiprofessional	5.2	14.7
Proprietors, managers and officials, except farm	8.9	16.3
Clerical, sales and kindred workers	12.5	21.4
Craftsmen, foremen and kindred workers	15.2	10.0
Operatives and kindred workers	18.6	16.3
Farmers, farm laborers and farm foremen	21.7	10.5
Service workers	6.2	3.6
Laborers, except farm and mine	11.7	7.2
Total	100.0	100.0

*From "Comparative Occupation Statistics for the United States, 1870-1940," Bureau of the Census. Percentages are based on the 1940 census.

Table 6 • Percentage distribution of patients by estimated income*

Income	Per cent of patients
Under $1,000	2.0
$ 1,000–$1,999	4.9
$ 2,000–$2,999	14.9
$ 3,000–$3,999	23.8
$ 4,000–$4,999	18.7
$ 5,000–$5,999	13.0
$ 6,000–$7,999	9.3
$ 8,000–$9,999	4.9
$10,000 and up	8.5
Total	100.0
Median	$4,240.00

*If patient was a dependent, income of family head was recorded.

Table 7 • Percentage distribution of families and unrelated individuals in general population by total money income, 1950

Income	Per cent of families and individuals
Under $1,000	18.4
$ 1,000–$1,999	14.2
$ 2,000–$2,999	17.5
$ 3,000–$3,999	18.8
$ 4,000–$4,999	11.7
$ 5,000–$5,999	7.5
$ 6,000–$9,999	9.1
$10,000 and up	2.7
Total	100.0
Median	$2,990.00

Source: "Income of Families and Persons in the United States: 1950," Series P-60, No. 9, Bureau of the Census.

Table 8 • Percentage distribution of patients by length of time since last visit to a dentist, and by sex

Length of time since last visit to dentist	Males	Females	Total
1 to 14 days	18.6	19.8	19.3
15 to 30 days	7.4	8.0	7.8
31 days to 5 months	10.9	12.1	11.6
6 to 11 months	20.0	21.9	21.1
1 year	13.2	13.2	13.2
1½ years	4.8	4.5	4.7
2 years	9.3	8.4	8.7
3 years	4.4	4.0	4.2
4 years	2.8	2.1	2.4
More than 4 years	5.1	3.6	4.2
Never been to dentist before	3.5	2.4	2.8
Total	100.0	100.0	100.0
Median	37.9 weeks	34.4 weeks	35.9 weeks

Table 9 • Results of poll of adults in general population regarding length of time since last visit to a dentist, conducted in 1950 by the American Institute of Public Opinion.

Visited dentist about:	Males %	Females %	Total %
1 month ago or less	9	11	10
2 to 5 months ago	9	11	10
6 to 11 months ago	13	15	14
1 year ago	16	15	16
1½ years ago	2	1	2
2 years ago	10	10	10
3 years ago	7	6	6
4 years ago and over	28	27	27
Never been to a dentist	5	3	4
Can't remember	1	1	1
Total	100	100	100

Source: News release, American Institute of Public Opinion, June 21, 1950.

ducted in 1950 by the American Institute of Public Opinion on the question of length of time since seeing a dentist. In comparing Table 8 with Table 9, two important differences should be remembered: the Gallup poll was not restricted to dental patients but covered the general population, and the Gallup poll included only persons 21 years of age or older.

The 1950 census showed that nonwhite persons comprised 10.3 per cent of the total population. Of the patients included in this survey, only 2.2 per cent are nonwhite. Because of this marked underrepresentation, and because of established racial differences in prevalence of dental disease, separate tables will be presented for white and nonwhite patients in this survey.

The next article in this series will present data on needs for dental care according to the age of the patient. It is scheduled to appear in the January 1953 issue of THE JOURNAL.

B. Duane Moen, Director

LON W. MORREY, D.D.S., EDITOR

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Editorials

They need your blood

Slightly more than a year ago America launched a nationwide blood bank program. Since then much has been accomplished, but much remains to be done. One item of unfinished business is to make every dentist appreciate the important part he can play in this national life-saving drama. These lines then, are written about blood—your blood—and your son's blood, and the blood of the kid on the corner whose lower incisors, fractured by his first bicycle spill, were saved by you only to be lost later together with half his mandible on the Kumhra ridge in Korea. He needs blood now and so do thousands of his buddies—and so does the little girl in the next block who dashed off the curb into the path of an auto. And so does the young mother in the maternity ward fighting for her life and the life of another.

Professional background, training and inclination condition the dentist to become a key figure in building the blood bank in his community and in making it an integral part of the nation's blood program. This program, functioning under the direction of a subcommittee on blood established by the Health Resources Advisory Committee, Office of Defense Mobilization, is designed to coordinate existing blood bank projects so as to meet more adequately the nation's need for blood and its derivatives. The American National Red Cross has been designated as the blood collecting agency of the program and it will cooperate with existing organizations so as to gear the nation's blood collecting activities into an integrated whole.

Blood and blood plasma cannot be produced in factories like steel or brass or plastics. There is no substitute for human blood. Its only source is the human body. Increased activities in Korea, plus increased civilian accidents, have drained the supply of this life-giving substance in many areas close to the danger point.

Military and health authorities urge that the supply be replenished quickly in order to meet the requirements of those wounded in war, injured in accidents and others dangerously ill.

Of course, the National Red Cross can be counted on to supervise carefully the nation's network of blood banks but it cannot be expected to be entirely responsible for the program's success. The ultimate success of the program will depend on the response of society. The dentist is in a strategic position to stimulate the development of his community's blood bank program. He can serve on important committees. He can discuss the project intelligently with his patients. He can encourage them to become donors. And, if in good health and less than sixty years of age, he can contribute, on occasion, a pint of blood himself. Remember the words of Washington: "Where is the man to be found who wishes to remain indebted for the defense of his own person and property to the exertion, the bravery and the blood of others, without making generous effort to repay the debt of honor and gratitude."

Don't wait to be invited to participate in your community's blood bank program. Offer your services and offer your blood.

Confused logic—the Relief Fund and OASI

Recently a letter arrived in the editorial department the contents of which are such that it should be shared by all. It is printed here, in part, as a good example of bad reasoning:

> . . . Because the House of Delegates of our Association, at the recent meeting in St. Louis, refused to approve the recommendation that dentists be included in the Old Age and Survivors Insurance Program of the National Social Security Act I refuse to donate to the Association's Relief Fund. . . .

Such reasoning is remindful of the small boy who, because his mother refused him cookies, vowed never again to drink his milk. The ancients had a phrase for it: "Don't cut off your nose to spite your face."

Here again, it cannot be emphasized enough that the Association is a democratic body whose hopes and aspirations and views are reflected in a duly constituted House of Delegates. The fact that these delegates voted overwhelmingly to reject any participation of the dental profession in the Old Age and Survivors Insurance program of the federal government should be accepted with good grace as the majority wish of the 77,000 members of the Association. It should be pointed out, too, that the majority of the delegates were instructed by their own constituent societies on how to vote on the question of OASI after all sides of the issue had been thoroughly studied and weighed by their fellow members.

Actually the purposes and provisions of OASI and of the Relief Fund are in no way parallel. OASI benefits are restricted to elderly individuals and their dependents. Relief Fund benefits are not governed by age but by need. Young as well as old dentists and their dependents are eligible for financial assistance from the fund provided their case is worthy and their need is real.

If you haven't given to the Fund as yet, do so now at Christmas time.

As the sweet tooth grows the health of teeth declines

Of more than passing concern to members of the dental profession is a recent report[1] that the annual wholesale candy bill of the American people is about a billion dollars. Strangely enough the nation's dental bill, last year, totaled much the same amount. This statement does not imply any *post hoc ergo propter hoc* reasoning. Probably it is only a coincidence that the two sums are of equal and astronomical proportions. At the same time it should not be overlooked that the consumption of candy, like the incidence of dental caries, has increased perceptibly over the years. "Since 1949," says the report, "the annual volume of candy and confectionary production has expanded at an encouraging rate." During the same period, no doubt, the volume of dental caries increased at a discouraging rate.

Last year, it is reported, retail candy sales in the United States totaled approximately 1,620 million dollars for a record breaking consumption per capita of about $10.72, or 64 per cent more than the $6.55 spent per capita for dental care during the same period. It may be that the difference between the nation's annual retail expenditure for candy and its annual expenditure for dental care accounts for the fact that cavities occur in children's teeth six times as rapidly as they are repaired.

The healthy or unhealthy growth in candy sales—depending on the commercial or professional viewpoint—is attributed to a prosperous economy, an expanded population, an improved sales system, the fact that "Americans just plain like and want candy" and, last but not least, to effective advertising. National candy advertising expenditures which amounted to $7,257,120 in 1950 jumped to $10,119,889 in 1951 and to $5,553,049 in the first six months of 1952.

Given, then, a nation with a natural sweet tooth, stimulate its craving for confections by constant and skillful promotion, satisfy that craving by the injudicious apportionment of the nutritional dollar, and eventually there will result a people satiated with sweets but sans the teeth to enjoy them fully. The damage done human dentition by what formerly was considered only a pleasant and, at worst, an innocuous concoction staggers the imagination as much as it does the budget.

The problem is to find the best means of preventing that damage. A means has been discovered which retards the formation of caries. This means—fluoridation of water—is being adopted rapidly by many communities. But fluoridation is only partially successful. More research is needed to discover a more effective method of combating the disease. Since the laws of nature are immutable, it is unlikely—indeed undesirable—that researchers will discover a means of completely overcoming the effects of overindulgence. Good dental health, like good general health, will never be attained until man is educated to practice some intelligent self-restraint.

Dentists, armed with the knowledge that more than ten million dollars is being spent annually to whet a harmful habit, must double or triple their educational efforts to help counteract the habit's damaging effects.

1. The candy market. Tide, August 22, 1952, page 24.

Association Affairs

RELIEF FUND DONATIONS TOTAL $39,418 ON NOVEMBER 15

Contributions to the Association's 1952-53 Relief Fund drive totaled $39,418 as of November 15, at the end of the first month of the campaign. Dentists in North Dakota led in per capita donations on November 1, when their contributions equaled 79 per cent of their quota. Alaska, second in per capita contributions, had attained 50 per cent of its goal on November 1.

The annual Relief Fund campaign is conducted by the 54 constituent societies of the Association to raise funds for assistance to those members of the dental profession who, through accident or illness, are totally unable to help themselves.

The campaign goal for this year is $100,000. Leo W. Kremer, chairman of the Council on Relief which administers the fund, has appealed this year for "a wholehearted response" to fill an increased number of applications for aid.

1953 DENTAL DIRECTORY TO BE PUBLISHED THIS MONTH

The 1953 edition of the *American Dental Directory*, which will be published this month, lists approximately 85,000 dentists in the United States and its territories. Names may be located either alphabetically or by state and city; specialists may also be found in a separate listing, according to the field of specialization.

The directory's reference section includes information on state dental societies, state boards of dental examiners, colleges of dentistry and dental hygiene, schools for training dental assistants and laboratory technicians, state dental health departments, specialty boards and the national dental associations of the world.

The new directory, now published on an annual basis, is on sale at $7.50. Orders may be addressed to the Order Department, American Dental Association, 222 East Superior Street, Chicago 11.

GREATEST NUMBER OF MEMBERS RECORDED BY ASSOCIATION

The Association listed a record total of 77,191 members as of October 31. Included in this number were 67,424 active and life members, 9,527 students, 222 affiliates, 9 associates and 9 honorary members.

U. S. COMMISSION FOR UNESCO COMMENDS ASSOCIATION

The American Dental Association received a commendation for its program of international cooperation during the recent meeting of the United States National Commission for UNESCO in Washington, D. C.

Stanley D. Tylman of Chicago, who represented the Council on International Relations of the American Dental Association, told the Commission of the work of the Association in rebuilding and augmenting the dental libraries of schools and organizations throughout the world. He also discussed the teaching missions which the Association has sent to different parts of the world, and he cited the cooperation extended by the Association to foreign students, researchers and other visitors in the United States.

The Association is one of 60 organizations represented on the Commission, which acts as an advisory group to the United States Department of State and the United Nations Educational, Scientific and Cultural Organization.

INSURANCE COVERAGE PERILED BY NONPAYMENT OF DUES

Dentists who fail to pay their 1953 membership dues by March 31 will jeopardize their insurance coverage under plans sponsored by the Association and constituent societies, it was announced recently by Louis M. Cruttenden, assistant secretary of the Association.

During the recent session of the House of Delegates, March 31 was decreed the deadline for payment of national dues; any individual whose dues are not received by that date will cease to be a member in good standing. Until his dues are paid, his coverage may be affected under terms of the Association's life insurance and health and accident policies, as well as the policies of many constituent societies.

REPORT ON HOSPITAL SURVEY AVAILABLE ON REQUEST

Approximately one out of every three hospitals in the United States and its possessions currently has a dental department, it is revealed in the new edition of "Hospitals Reporting Dental Departments, 1952." The book, a 107-page mimeographed directory based on a recent survey, has been compiled by the Bureau of Economic Research and Statistics, the Council on Hospital Dental Service and the Council on Dental Education.

The source material for this study was the annual survey conducted by the American Hospital Association. Within the survey it was revealed that a total of 2,084 hospitals reported the operation of dental departments. Within this listing, 280 dental departments have been approved by the Council on Hospital Dental Service. In addition, 84 dental internship educational programs and 32 dental residency educational programs reported in the survey have been approved by the Council on Dental Education.

The book may be obtained without charge by writing to the Order Department, American Dental Association, 222 East Superior Street, Chicago 11.

STATE SOCIETIES ASKED TO NAME DELEGATES SOON

State societies have been advised to name their delegates to the 94th annual session at an early date. A recent memorandum to officers of constituent societies from Harold Hillenbrand, secretary of the Association, pointed out that the membership of a constituent society as of December 31 is to be used hereafter as the basis for determining its number of delegates for the succeeding year.

The early designation of delegates is advisable, Dr. Hillenbrand noted, to facilitate the mailing of informational materials to them and to enable them to receive priority housing. As reference committees of the House of Delegates will be named "at a date early in 1953," it will be impossible to give consideration to delegates whose names are not received early in 1953. Substitutions may be made later if necessary, Dr. Hillenbrand added.

STATE SECRETARIES CONFER ON MANAGEMENT PROBLEMS

A highlight of the fifth State Secretaries' Management Conference, held November 17-19 at the Central Office, was a session devoted to reports on state society projects. Participants in the Conference, representing 19 state dental societies, exchanged information on current activi-

Nineteen state dental societies were represented by the secretaries and executive secretaries shown above, at the fifth State Secretaries' Management Conference, held November 17-19 in the Central Office. Participating Central Office staff members also are shown.

ties in different sections of the country.

One of the six sessions was devoted to problems encountered in the management of a constituent society's annual session. Presentations and discussions concerned the handling of scientific and social programs, business problems and publicity. At other sessions, participants discussed student membership programs, the planning of district officers' conferences, technics and problems in state society negotiations, technics for fact finding, the returning serviceman's membership and costs in operation of constituent societies.

After group meetings were held on the opening day to determine topics for general discussion, the last session was spent in discussing these topics.

KIT FOR CHILDREN'S DENTAL HEALTH DAY DISTRIBUTED

A kit of program and publicity suggestions has been distributed to chairmen of local Children's Dental Health Day committees by the Association's Bureau of Public Information.

The kit includes sample radio scripts and spot announcements, a series of newspaper items and a new book of recommendations for program planning, community participation, school activities and promotional events. Single copies of several booklets available for lay distribution supplement a catalog of suggested materials. Children's Dental Health Day will be observed on February 2, 1953, throughout the country.

COUNCIL ON DENTAL HEALTH DISCUSSES PREPAYMENT PLANS

Problems associated with the development of dental prepayment plans were discussed by representatives of Blue Shield medical care plans at a conference during the recent three-day meeting of the Council on Dental Health.

The Blue Shield officials advised the state society to initiate a pilot study of the proposed plan before establishing any prepayment plan for dental care. The initial plan should cover only a limited area; it should insure only the most serious risks, requiring major dental surgery, and should gradually expand to cover lesser risks as the program grows, they said.

In other sessions, the Council on Dental Health discussed directives from the

House of Delegates, tentative public health programs and the planned reorganization of the program of the division of dental health education. David W. Brock of St. Louis, chairman of the Council, presided.

FILM LIBRARY CIRCULATES RECORD NUMBER OF FILMS

All dental health films circulated by the Association's film library have been reserved by dental organizations for the period during which Children's Dental Health Day will be observed. No films on dental health will be available during the last week of January and the first two weeks of February.

Through the cooperation of the Film Council of America, the film library is distributing five copies of "Swab Your Choppers" to community libraries in the midwestern area. The Film Council has included the dental education cartoon in its circulating preview kit, to be viewed by librarians and program chairmen of clubs in various communities. If the local organizations find the dental film suitable for a group program, they may order it from the Association.

ORAL PATHOLOGY FELLOWSHIP TO BE DISCONTINUED

The fellowship sponsored by the Association at the Armed Forces Institute of Pathology will be discontinued at the end of this fiscal year.

A function of the Council on Museum and Registry, the fellowship provided for the training of a teacher of oral pathology. The recipient for the last two years did not apply for a renewal of his fellowship. He plans to enter the teaching profession, it was announced by Henry Swanson of Washington, D. C., chairman of the Council.

Again this year, the Association will contribute $1,500 to the Armed Forces Institute of Pathology.

AD INTERIM APPOINTMENTS TO THREE COUNCILS ANNOUNCED

Three *ad interim* appointments have been announced by Otto W. Brandhorst, president of the Association.

Oren A. Oliver of Nashville, Tenn., has accepted the chairmanship of the Council on International Relations, succeeding Paul Jeserich of Ann Arbor, who found it impossible to accept the office to which the Board of Trustees had named him.

Edward Mimmack of Buffalo has been appointed to the Council on Dental Therapeutics to succeed George B. Clendenin of Bethesda, Md., who resigned. F. Noel Smith of Baltimore has been appointed to the Judicial Council to fill the vacancy caused by the resignation of George M. Anderson of Baltimore.

The new appointees will serve until 1953 annual session, when the House of Delegates will elect successors.

ASSOCIATION RECEIVES COMMEMORATIVE LEBANESE RUG

An oriental rug woven by war-orphaned children of Lebanon in the 1920's was presented to the American Dental Association by H. H. Srabian of Beirut, representing the Lebanese Dental Association, at the recent annual session in St. Louis.

The rug commemorates an "American Near East Relief Inter-Orphanage Mouth Cleanliness Contest," and was given by the children to Dr. Srabian while he was dentist to the American Near East Relief organization.

In presenting the gift, Dr. Srabian said, "I have had this rug for over a quarter of a century. I wish now to present it to the American Dental Association as a token of gratitude to American dentists and the people of these United States of America, who have done so much for the people of the Near East."

COMMITTEE ON ARRANGEMENTS FOR 1953 SESSION NAMED

The officers and subcommittee chairmen of the committee on local arrangements for the 1953 annual session of the American Dental Association have been announced by Walter J. Pryor, general chairman. The committee includes:

Ralph E. Creig, vice-chairman
James V. Gentilly, vice-chairman
Thomas J. McDermott, secretary
Stanley R. Suit, treasurer
Harry J. Geurink, chairman of the subcommittee on information
John T. Reifke, chairman of the subcommittee on publicity
Wiley F. Schultz, chairman of the subcommittee on reception
Samuel S. Cohen, chairman of the subcommittee on social and entertainment events
Mrs. Herbert J. Hoppe, chairman of the subcommittee on women's entertainment
Louis C. Meier, chairman of the subcommittee on convention hall

The 94th annual session will be held September 28-October 1, in Cleveland.

Dental Societies

B. HOLLY BROADBENT RECEIVES CALLAHAN MEMORIAL AWARD

B. Holly Broadbent of Cleveland has received the Callahan Memorial Award of the Ohio State Dental Association, in recognition of his achievement in the development of the Broadbent-Bolton cephalometer. The award was presented to Dr. Broadbent on November 10, during the annual session of the Ohio State Dental Association in Columbus.

PHILADELPHIA MEETING TO BE HELD FEBRUARY 4-6

A symposium on "The General Health of the Dentist" will be presented by five physicians at the Greater Philadelphia Meeting, to be held February 4-6 at the Bellevue-Stratford Hotel, Philadelphia.

Topic discussions on dental public health, prosthetic and operative dentistry, dental practice management and dental infections will also be featured during the meeting, which is sponsored by the Philadelphia County Dental Society. Nine registered clinics will be presented February 4 and 5; table clinics, on February 6.

Further information may be obtained by writing to the Philadelphia County Dental Society, Bellevue-Stratford Hotel, Philadelphia 2. Thomas P. Fox of Philadelphia, chairman of the meeting, reports that a registration of 5,500 is expected.

MONTANA ASSOCIATION NAMES NEW EXECUTIVE SECRETARY

The new executive secretary of the Montana State Dental Society is L. Russell Hegland, who served the Chicago Dental Society in the same post during 1943-50. In addition to assuming his new duties, Mr. Hegland will continue in his present position as executive secretary of the Montana State Medical Society; he will maintain dual offices at 240 Stapleton Building, Billings, Mont.

DALLAS COUNTY DENTISTS PLAN 26th MID-WINTER CLINIC

The 26th annual Dallas Mid-Winter Dental Clinic will be conducted January 25-28, 1953 at the Adolphus Hotel, Dallas, Texas, under the auspices of the Dallas County Dental Society.

Further information may be obtained by writing to W. C. McCaskill, Jr., general chairman, 1329 Medical Arts Building, Dallas, Texas.

NEW YORK FIRST DISTRICT SPONSORS WORKSHOP

Trends in Dental Public Health and Dental Care in Industry will be the subject of an all-day workshop to be held January 30, 1953, at the Hotel Statler, New York City.

Sponsored by the First District Dental Society of the State of New York, the workshop will be divided into a morning panel on "occupational oral medicine and public health" and two afternoon panels on "dental care in occupational-health programs" and on "the private dentist's role in community-program planning."

Alfred J. Asgis and Allan G. Boynton of New York, chairman and co-chairman of the workshop, have announced that the meetings will be open to members of the health professions. Interested persons may write for registrations forms to Public Health Workshop, First District Dental Society, Hotel Statler, New York City.

THOMAS P. HINMAN CLINIC TO BE HELD MARCH 22-25

The Thomas P. Hinman Mid-Winter Clinic, sponsored by the Fifth District Dental Society of Georgia, will be conducted March 22-25, 1953, in the Municipal Auditorium, Atlanta, Ga. Thomas Conner of Atlanta is general chairman of the event. Further information may be obtained by addressing him at 478 Peachtree Street, N. E., Atlanta, Ga.

National Defense

ADMIRAL PUGH ACCUSES DENTISTS OF EVADING DUTY

Rear Admiral Lamont Pugh, Surgeon General of the Navy, has charged that greed for "easier, quicker and bigger money" is keeping many civilian dentists and physicians from entering the military services.

Speaking before the annual meeting of the Association of Military Surgeons on November 17, Admiral Pugh accused dentists and physicians of avoiding military duty. He said in part:

> Since when has the doctor of medicine and dentistry become such a pantywaist as to require that a bald responsibility others accept with good grace must be decked out with certain frills before he will buy it? . . .
>
> During my sojourn at the combatant front in Korea this past summer I failed to detect evidence of any special effort being made on the part of anyone to make the service more attractive to the soldiers and marines who were fighting, bleeding and dying in the heat and dust on a barren Korean hillside.

ASSOCIATION SECRETARY REPLIES TO ADMIRAL PUGH

Following is the text of a statement by Harold Hillenbrand, secretary of the Association, which was issued in reply to an attack on the dental and medical professions made by Rear Admiral Lamont Pugh:

> Admiral Pugh's statement about dentists not volunteering for reasons of avarice is not only incorrect but unworthy of the service to which members of the dental profession have contributed so much. Admiral Pugh follows the usual military pattern of blaming everyone but the military for mistakes in the handling of military problems.
>
> Dentists, in World War I, in World War II and in the Korean emergency, have met the full call of their country and the real needs of those who are serving their country as fighting men. Dentists have not been willing, however, after the profligate waste of health personnel manpower which characterized military health services during World War II, to meet every whim dreamed up by a military administrator to increase the size of his

Wilton Cogswell, Sr., of Colorado Springs (right), oral consultant at Air Defense Command Headquarters, instructs Air Force dentists in the technic of removing impacted and unerupted teeth. The five-day course, first presented in November, will be repeated four times in the next seven months to dental surgeons throughout the Air Force. Lt. Col. Sydney G. Gordon, command dental surgeon at Ent Air Force Base, organized the course, the first of its type to be used in the Air Force.

work force, often at needless expense of the civilians who al contribute to the fighting force.

Two years ago the military asked for a compulsory draft act for dentists and physicians to meet an emergency. Today, two years later, the military are again asking for renewal of this act. In the intervening two years, the military has demonstrated its incompetence in arriving at the solution of a problem which is critical to the health and welfare of all of the nation.

The health professions and all citizens have a right to ask whether incompetent planning on the part of the military justifies charges against the health professions. Admiral Pugh has done a distinct disservice to all men and women who are engaged in actual fighting.

Congress should be asked at once to inquire into the circumstances which surround this confession of failure on the part of the military concerned with the health of those who are fighting for their country.

AIR FORCE APPOINTS DENTIST ORAL SURGERY CONSULTANT

Lt. Col. Richard J. Burch, DC, USAF, has been appointed consultant in oral surgery for the Far East Air Forces by FEAF headquarters. The Far East command is composed of forces in Japan, Korea, Okinawa, the Philippines and Guam.

Colonel Burch, who is a diplomate of the American Board of Oral Surgery, was graduated from Washington University dental school, St. Louis, in 1931 and has spent 17 years in the air services. During the latter part of World War II he directed all dentists in the Air Corps Training Command from headquarters in St. Louis.

Colonel Burch is now stationed at the Air Force hospital in Nagoya, Japan, while serving as consultant in the entire area.

James P. Hollers of San Antonio, Texas, dental member of the Armed Forces Medical Policy Council (right), visited the dental clinic of the Wiesbaden Air Force Hospital during a recent series of visits to military dental installations in Europe. Here he is joined by (l. to r.) Col. Walter J. Reuter, USAFE Dental Surgeon, Lt. Col. Benjamin W. Dunn and Capt. Robert L. Ryan.

ADMIRAL R. W. MALONE NAMED NAVY'S DENTAL INSPECTOR

Rear Admiral Ralph W. Malone, DC, USN, has been appointed Inspector General, Dental, of the U. S. Navy's Bureau of Medicine and Surgery, Washington, D. C. He fills the vacancy created by the recent retirement of Rear Admiral Alfred W. Chandler, DC, USN.

Admiral Malone was graduated from the Atlanta-Southern Dental School (now Emory University's dental school) in 1919 and practiced dentistry in North Carolina until his entrance into the Navy in 1926. He has served as an instructor at the Naval Dental School, Washington, D. C., for several years; his other assignments include war and peacetime cruises and shore appointments in this country and in Hawaii. Prior to his present assignment, Admiral Malone was Commanding Officer of the U. S. Naval Dental Clinic in Brooklyn.

R. W. Malone
Rear Admiral, USN

Dental Education

DENTAL INTERNSHIP OFFERED BY JEWISH SANITARIUM

The Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn, is offering a dental internship which includes work in oral diagnosis, pedodontics, endodontics, periodontics, all phases of restorative dentistry, oral surgery, exodontics, and dental anesthesiology and roentgenology.

The internship will extend for one year, from July 1, 1953 to June 30, 1954. Further information may be obtained from Joseph J. Obst, director of dentistry at the Hospital, East 49th Street and Rutland Road, Brooklyn 3.

PENNSYLVANIA TO SPONSOR WORLD ENDODONTICS MEETING

A World Conference on Endodontics will be held June 21-27, 1953, at the School of Dentistry, University of Pennsylvania. Outstanding leaders in the field of endodontics participating in the conference will include Francisco Pucci of Montevideo, Uruguay; W. Stewart Ross of London, England, and B. Nygaard Ostby of Oslo, Norway.

The Conference will be directed by Louis I. Grossman, who has announced that the fee for attendance at the seven-day conference will be $100. Applicants may direct inquiries to Postgraduate Courses, School of Dentistry, University of Pennsylvania, Philadelphia 4.

NEW YORK POLYCLINIC OFFERS DENTAL INTERNSHIPS

Applications are being accepted by the New York Polyclinic Hospital for an approved internship, including oral diagnosis, pedodontics, endodontics, periodontics, all phases of restorative dentistry, oral surgery, exodontics and dental anesthesiology and roentgenology.

The internship will be awarded to three qualified applicants and will include full maintenance and a stipend of

$75 per month from July 1, 1953 to June 30, 1954. Applications may be addressed to Malcolm W. Carr, director of the division of dentistry, New York Polyclinic Medical School and Hospital, New York 19.

ALVIN W. BRYAN TO TEACH PART-TIME AS DEAN EMERITUS

Alvin W. Bryan, who will retire as dean of the College of Dentistry, State University of Iowa on January 1, will continue to teach at the school on a part-time basis. Dr. Bryan has been dean of the dental school since 1932 and has been a member of the faculty since 1912.

Alvin W. Bryan

He was born at Marcus, Iowa, and was graduated from the College of Dentistry, State University of Iowa in 1911. He has been president of the Iowa State Dental Society, American Academy of Periodontology, American Association of Dental Schools and American College of Dentists. He is a fellow of the American Academy for the Advancement of Science, New York Academy of Dentistry, Iowa Academy of Science and is a member of the International Association for Dental Research, Sigma Xi, Delta Sigma Delta and Omicron Kappa Upsilon.

Dr. Bryan's successor as dental dean at the State University of Iowa will be William J. Simon, professor of operative dentistry at the University of Minnesota School of Dentistry.

DENTAL SCHOOLS TO OFFER NEW POSTGRADUATE COURSES

California • The extension division of the University of California, in cooperation with the Southern California State Dental Association, will present the following courses in Los Angeles during December and January:

Function, a Prime Object of Dentistry, a three-day course by Arne G. Lauritzen, December 12-14; Applied Anatomy of Temporomandibular Joint, by Harry Sicher, a two-day course, December 17-18; Cavity Preparation and Casting Inlays, by Ernest Goering, a one-day course to be presented three times, January 6, 13 and 20; Gold Foil, by John C. Metcalf, a one-day course to be presented January 7, 14 and 21; Amalgam Restorations, by Ernest E. Cannon, a one-day course to be presented January 8, 15 and 22; Nutritional Deficiencies, Etiology, Diagnosis and Treatment, by F. M. Pottenger, one-day course to be presented December 3, 10 and 17.

Further information may be obtained by writing to J. Eugene Ziegler, director of the dental program, University Extension, 813 South Hill Street, Los Angeles 14, Calif.

Temple • Postgraduate courses in endodontics and periodontics will be offered during the winter by Temple University dental school.

Endodontics, a course under the direction of Morton Amsterdam and associates, will be presented for seven successive Wednesdays, from 9 A.M. to 4 P.M., beginning February 11.

Periodontics will be presented by Jacoby T. Rothner and staff on seven successive Thursdays, 9 A.M. to 4 P.M., beginning February 12. Both courses will be limited to 15.

A two-week course in orthodontics will begin January 25. Open to practicing orthodontists only, it will be presented under the direction of Robert H. W. Strang.

Occlusal rehabilitation will be the subject of a six-day course to be presented by Louis A. Cohn of New York, February 2-7. The concentrated week of lectures and clinical demonstrations will feature the application of many time-saving technics and instruments to practical cases.

Applications may be obtained from the director of postgraduate studies, Temple University School of Dentistry, 3223 North Broad Street, Philadelphia 40.

Ohio State • During the winter term the College of Dentistry, Ohio State University, will present seven postgraduate courses in dentistry.

Full denture prosthesis, by Carl O. Boucher, will be presented January 12-16; periodontics, John R. Wilson, January 19-23; children's dentistry, Lyle S. Pettit, January 26-30; oral surgery, D. P. Snyder, February 2-6; partial denture prosthesis, Victor L. Steffel, February 16-20; endodontics, J. Henry Kaiser, March 2-6; airbrasive technic, J. N. Bowers and Robert Trippy, March 9-13. Each course is presented Monday through Friday, and enrollment is limited to ten per class.

Further information and application may be obtained from the postgraduate division, College of Dentistry, Ohio State University, Columbus, 10, Ohio.

New York • Refresher courses in periodontics will be presented during the coming term by the New York University College of Dentistry, it has been announced by S. C. Miller, chairman of the periodontics department.

The three-weeks courses, as well as introductory courses of 10 weekly sessions, will begin February 25 and June 1. Dr. Miller has also announced that a full-time course in periodontics and oral medicine will be offered from September 21, 1953, to May 21, 1954.

Further information may be obtained by writing to the secretary of the postgraduate division, New York University College of Dentistry, 209 East 23rd Street, New York 10.

Toronto • Four continuation courses for dentists will be offered during January and February by the Faculty of Dentistry, University of Toronto. Class limits are 10 to 14 students.

The new clinic building of the University of Southern California School of Dentistry, shown here, contains 200 dental chairs, complete roentgenographic facilities and technical laboratories. The clinic was dedicated October 24 at ceremonies attended by thousands of alumni, students and guests.

Periodontics will be offered January 19-23, under the direction of H. K. Box and C. H. M. Williams.

Cephalometric Technics will be taught by Robert E. Moyers and guest clinician Herbert Margolis of Tufts College Dental School, January 26-28.

Operative Dentistry, under the direction of P. G. Anderson, will be presented February 16-20.

Dental Radiology, to be given February 23-27, will be presented by J. E. Moser and a guest lecturer, H. M. Worth.

Inquiries may be addressed to The Dean, Faculty of Dentistry, University of Toronto, 230 College Street, Toronto 2-B, Canada.

COURSE IN AIRBRASIVE TO BE TAUGHT IN SPANISH

A special course in airbrasive will be offered in Spanish for South American dentists, January 26-February 3, 1953, at the School of Dentistry, University of Pennsylvania .

Julio Asturias, assistant professor of operative dentistry, will present the course. He is a native of Guatemala.

Enrollment will be limited to 10. Further information may be obtained by writing to the dean, the Thomas W. Evans Museum and Dental Institute, 4001 Spruce Street, Philadelphia 4.

Public Health

PENNSYLVANIA DENTIST JOINS VA COUNCIL OF CONSULTANTS

Herbert K. Cooper of Lancaster, Pa., was recently appointed dental consultant on the Council of Chief Consultants of the Veterans Administration. Dr. Cooper, director of the Lancaster Cleft Palate Clinic, is the first dentist to be named to the VA council, it was announced by Vice Admiral J. T. Boone, chief medical director.

Dr. Cooper, a faculty member of the dental schools at the University of Pennsylvania and Tufts College, is a past president of the Pennsylvania State Dental Society and a recipient of the Benjamin Rush Award of the State Medical Society in 1947.

453 CITIES FLUORIDATING; COST IN CAPITAL DECREASES

In St. Paul and San Diego, which each have over 300,000 persons, fluoridation of water supplies is now in operation. Since the Council on Dental Health published its survey of fluoridation programs in the November issue of THE JOURNAL, the total number of communities with fluoridated water supplies has increased to 453, and the number of persons receiving fluoridated water totals eight million.

In Washington, D. C., meanwhile, a district engineer told a regional meeting of the American Water Works Association that fluoridation costs are decreasing for the capital city. Gilbert Levin, engineer in the District Public Health Department, said that the total cost of fluoridation will amount to about $10,000 a year less than originally estimated.

HEALTH CENTER PLAN INCLUDES PREPAYMENT OF DENTAL CARE

A prepayment insurance plan which proposes to provide individuals with medical, dental and hospital care for two dollars a week has been announced by a new organization, the American Federation of Medical Centers, Inc. Its founder, a Detroit surgeon, Edgar H. Norris, reportedly has obtained the support of large industrial corporations to finance the early operation of the plan.

J. G. Williams (left), director of the dental division, Georgia Department of Public Health, is congratulated by Frampton Farmer, (center), president of the Georgia Dental Association, and M. E. Winchester, commissioner of the Glynn County-Brunswick (Ga.) Department of Health, on receiving an inscribed silver platter from the Georgia Association of Public Health Physicians "in appreciation of his invaluable contributions to public health dentistry." Dr. Williams has served his state for 20 years without compensation.

The A.F.M.C. program calls for the following:

1. The establishment by communities of self-sustained medical centers with clinics, hospital, a balanced staff and modern equipment;
2. The operation in these centers of efficient group practice, through selected teams of general medical and dental practitioners, specialists, nurses and medical technicians;
3. The creation of a system of voluntary prepayment for medical care in which each individual will receive preventive and curative treatment.

Policies might be purchased for impoverished families through welfare funds heretofore used for individual crises, it was suggested by the A.F.M.C. The group contends that medical centers would provide facilities for medical education and research. Employers might participate in the purchase of A.F.M.C. prepayment policies for employees.

The organization estimates that the new plan will benefit participating physicians and dentists in six ways:

1. Reduce wasteful "cross-hauling" or unnecessary travel time of both patient and physician or dentist;
2. Relieve physicians and dentists of costly and time-consuming administrative responsibilities;
3. Give the young medical or dental graduate a quicker start, with working connections which provide him with the necessary hospital and training experience without unreasonable financial sacrifice;
4. Attract physicians and dentists to medically unprotected areas which are now avoided because they lack adequate hospital and educational facilities;
5. Give physicians and dentists time and facilities for periodic research and study. Cooperation among members of a group permits vacations and more regular hours than can be enjoyed when a practitioner practices alone;
6. Protect the patients on a 24-hour basis.

The headquarters of the American Federation of Medical Centers is at 3919 John R Street, Detroit 1.

INDUSTRIAL DENTISTS FIND PLANT DENTAL SERVICES VARY

A dental service for employees is maintained by 7.5 per cent of the industrial plants in the United States, reports a recent survey conducted by the American Association of Industrial Dentists.

Other facts disclosed by the survey on dental services in industry include the following:

The main reason listed for establishing the services was improvement in attendance, with efficiency and good will listed as secondary reasons. Occupational hazards played a minor role.

Most industries limit the compulsory part of their dental service to examination and prophylaxis; employees may choose other treatment on an optional basis.

International

MALAYAN CHINESE DENTISTS GIVE FREE CARE TO REFUGEES

In the Federation of Malaya 500,000 families, who have fled from Communist terrorists and have been resettled in newly-established villages, will receive dental care through a program originated by two members of the Central Malayan Chinese Dental Association, Ng Yuen Watt and Ng Lian Tuan.

The government of Malaya is building dental clinics in the new resettlement villages; members of the Central Malayan Chinese Dental Association are providing free dental care in these clinics; equipment is being provided by the United Nations International Children's Emergency Fund.

The first to benefit from the Chinese dentists' plan were the 10,000 inhabitants of a village where a clinic was opened in July. The clinic is in full operation, staffed by members of the Central Malayan Chinese Dental Association. On October 19 the second clinic was opened. Ng Yuen Watt writes that he and his colleagues hope to extend the program to all parts of their country within the next few years.

INDIA'S MINISTRY OF HEALTH PLANS NEW DENTAL COLLEGE

The Ministry of Health of India has announced that active plans are being made for the formation of a dental college attached to the All-India Medical Institute at Delhi, India. A dental subcommittee has been appointed to advise the Government on the initial stages of establishment. Chairman of the subcommittee is K.C.K.E. Raja, director general of health on special duty with the Ministry of Health. Members of the committee are N. N. Bery of New Delhi, U. S. Malik of New Delhi and K. L. Shouri of Bombay.

At the seventh meeting of the Dental Council of India, held in Madras, October 3-4, Lt. Col. C. K. Lakshmanan of New Delhi was elected president of the executive committee. He is director general of health services for India.

Dr. Bery was elected vice-president and Dr. Malik, a member of the executive committee. Other members are: S. K. Majumdar of Calcutta, Bankum Mukerjee of Calcutta, V. M. Desai of Bombay and R. Ahmed of Calcutta.

BERLIN DENTISTS SEEK PROSTHODONTIC JOURNALS

Dentists of Berlin, Germany, are in need of prosthodontic journals published from the beginning of World War II to the present time. Maj. Hubert W. Merchant, DC, USA, dental surgeon of the Berlin Military Post, has addressed an appeal to members of the American Dental Association in behalf of the Berlin dentists.

The journals may be sent to Major Merchant, Office of the Post Dental Surgeon, Berlin Military Post, U. S. Army, APO 742. They may also be sent to Walter Drumm, Dr. med. dent., Berlin-Charlottenburg 9, Stallupoener Allee 18.

MUSEUM ITEMS, BOOKS NEEDED BY DENTAL COLLEGE OF INDIA

The newly organized Dental College and Hospital of Punjab University, Amritsar, Punjab, India, is interested in developing a library and dental museum for teaching purposes. The items most needed are periodicals and books, useful specimens, plaster or clay models illustrating human dental anatomy, physiology, histology, mounted roentgenograms showing abnormalities. Persons or institutions wishing to donate any of these items may write to M. L. Watts, Principal, Punjab University, Dental College and Hospital, Amritsar, Punjab, India.

General

WILLIAM O. TALBOT, EMINENT TEXAS DENTIST, DIES

William O. Talbot of Fort Worth, Texas, former trustee of the Association, died October 14 at the age of 79. Dr. Talbot was chosen as "the outstanding Texas dentist of the half century" in 1950. He had practiced for 58 years in Mississippi and Texas and had served as secretary and president of both state dental societies.

AMERICAN DENTURE SOCIETY ANNOUNCES ESSAY CONTEST

A prize of $100 will be awarded by the American Denture Society to the senior dental student who submits the best essay on prosthetic dentistry before next July. The contest is being conducted to stimulate technical writing among dental students, the Society reports.

Eleven rules are to be observed:

1. The contest is open to all senior dental students registered in any American dental college.
2. All essays are to be on some phase of prosthetic dentistry.
3. All essays are to become the property of the American Denture Society, and none will be returned.
4. The winning essay will be published in the *Journal of Prosthetic Dentistry*.
5. Essays must be double spaced, on plain paper with generous margins. No carbon copies or essays on onion skin paper will be considered.
6. Illustrations must conform to the standards of the *Journal of Prosthetic Dentistry*.
7. The essay must be worthy of publication in the *Journal of Prosthetic Dentistry* to qualify for the prize.
8. Essays must be postmarked by July 1, 1953, in order to receive consideration.
9. The judges are a special committee of the American Denture Society.
10. The decision of the judges is final.
11. All essays are to be marked clearly as contest papers and sent to: Carl O. Boucher, College of Dentistry, Ohio State University, Columbus 10, Ohio.

The next meeting of the American Denture Society will be February 7-8 in Chicago. Further information may be obtained from Arthur L. Roberts, secretary, Aurora National Bank Building, Aurora, Ill.

NEWEST CLAIMANT TO TITLE OF "OLDEST DENTIST" IS 91

A 91 year old dentist, who is associated with his son and grandson in dental practice in Paterson, N. J., has entered his claim to the title of "oldest practicing dentist in the United States." He is William H. Pruden, a life member of the Passaic County Dental Society, New Jersey State Dental Society and American Dental Association.

William H. Pruden

Dr. Pruden was born in Hanover Neck, N. J., on May 15, 1861. He became apprenticed to Benjamin F. Luckey, a dentist of Paterson, at the age of 19 and served as Dr. Luckey's assistant for seven years while completing his formal education at the old New York College of Dentistry, now New York University. In 1888 he entered private practice and has since been joined by his son, Kenneth C. Pruden, and his grandson, William H. Pruden II.

A widower, he lives in Ridgewood, N. J., and drives his car to Paterson every day, maintaining daily office hours.

DEDICATORY MEETING PLANNED BY IMPLANT DENTURE GROUP

A dedicatory meeting of the American Academy of Implant Dentures will be held February 7 at the Sheraton Hotel, Chicago. W. H. Crawford, dean of the University of Minnesota's dental school, will deliver the dedicatory address, and ten other speakers will present papers on different aspects of implant dentures. William E. Barb of Indianapolis is convention chairman.

Further information may be obtained by addressing Philip S. Loechler, secretary, 215 Tenth Street, S. E., Rochester, Minn.

PROSTHODONTICS BOARD SETS CERTIFICATION EXAMINATIONS

Examinations for certification by the American Board of Prosthodontics will be conducted at the School of Dentistry, University of Indiana, Indianapolis, February 1-7, 1953, it was announced recently by Irving R. Hardy, secretary-treasurer of the Board. Further information may be obtained from Dr. Hardy at Tufts College Dental School, Boston 11.

ORTHODONTISTS ASSOCIATION TO CONDUCT CONTEST

The American Association of Orthodontists is now conducting an essay contest to reward original research in the field of orthodontics. It is open to members of the organization and to other dentists affiliated with recognized dental institutions as teachers, students or researchers. A $500 cash prize will be awarded to the winner, and the three best papers will be published.

Robert E. Moyers, chairman of the research committee which will judge the entries, has announced the following rules:

1. Essays must be typewritten on 8½ by 11 inch white paper, double-spaced with inch margins and composed in good English.
2. Three copies of each paper, complete with illustrations, bibliography, tables and charts, must be submitted. The name and address of the author must not appear in the essay.
3. The author's name, together with a brief biographical sketch, should be typed on a separate sheet of paper and enclosed in a sealed envelope. The envelope should carry the title of the essay.
4. Essays must be received in triplicate on or before March 1, by J. A. Salzmann, 654 Madison Avenue, New York 21. The award will be announced during the annual meeting of the American Association of Orthodontists in April.

DENTIST WHO BOUGHT POLICY IN 1883 SOUGHT

Information regarding Benn B. Powers, a dentist who resided in Schuyler, Neb., in 1883, is being sought by the Union Central Life Insurance Company of Cincinnati. The company must remit to Dr. Powers or his heirs the amount payable on a policy which he bought nearly 70 years ago.

Dr. Powers was born in Erie, Pa., on March 14, 1857, and resided in Schuyler, Neb., at the time he applied for insurance. He had earned a D.D.S. degree by that date. Information on Dr. Powers or his heirs may be sent to Charles A. Handy, Union Central Life Insurance Co., Cincinnati.

SOUTHEASTERN ORAL SURGEONS ANNOUNCE MEETING DATES

The Southeastern Society of Oral Surgeons will hold its fourth annual meeting March 6-7, 1953, in Birmingham, Ala., it was announced recently by Irwin T. Hyatt of Atlanta, president.

Other officers of the Society for the current year are: Frank Jordan of Louisville, Ky., president-elect; George W. Matthews of Birmingham, vice-president; Charles Landis of Chattanooga, Tenn., secretary-treasurer, and Hill Gordon of Miami, Fla., editor.

ERROR IN JOURNAL OBITUARY LIST REPORTED

The November issue of THE JOURNAL reported in error the death of Stanley G. Lewis of Azusa, Calif. Dr. Lewis has called our attention to the fact that he is alive. The obituary list should have reported the recent death of Stanley M. Lewis of Dubuque, Iowa.

DEATH ENDS CONTROVERSIAL CAREER OF PAINLESS PARKER

Painless Parker, one of the most controversial figures in the history of American dentistry, died November 8 in San Francisco, at the age of 80. At one period in his career Dr. Parker vended his dental services with a medicine show, advertising "painless extractions." During the last 30 years he operated a chain of dental offices on the West coast and continued to practice despite efforts to suspend his license because of unprofessional conduct.

PLAN MEETING OF ACADEMY FOR ADVANCEMENT OF SCIENCE

A symposium on saliva will be the first presentation of the dentistry section of the American Academy for the Advancement of Science when it meets December 27 in St. Louis. The symposium will include papers by S. Wah Leung of the University of Pittsburgh dental school, James A. Shaw and Reider Sognnaes of Harvard dental school and Vincent F. Lisanti of Tufts College Dental School.

A symposium on restorative dental materials will feature essays by R. W. Phillips of Indiana University dental school, George C. Paffenbarger of the National Bureau of Standards and Duane F. Taylor of Washington University dental school.

A joint program on chemistry and dentistry will be presented December 28. Among the speakers will be Sidney Epstein of the College of Physicians and Surgeons, William H. Crawford of the University of Minnesota, Donald A. Wallace of the University of Illinois and J. F. Volker of the University of Alabama.

On December 30 Otto W. Brandhorst and L. Woodrow O'Brien of the Washington University dental school will speak on dental aspects of the cleft palate problem. Russell W. Bunting of Ann Arbor is secretary of the A.A.A.S. dentistry section; Nicholas G. Grand is local chairman.

Broadcasts of Radio Free Europe, beamed to countries behind the Iron Curtain, remind captive nations of their cultural heritage. Native Hungarian songs, banned by the communists, were sung and played recently by this trio of exiles (above), one of whom must remain anonymous to protect her relatives in Hungary. The House of Delegates of the American Dental Association has endorsed the Crusade and has pledged aid in its 1952 fund campaign.

ALPHA OMEGA TO HOLD INTERNATIONAL CONVENTION

The international convention of the Alpha Omega fraternity will be held in Toronto, Canada, December 28-31 at the Royal York Hotel. Further information may be obtained from Jesse Trager, 3300 Garrison Boulevard, Baltimore 16. Dr. Trager is national secretary of the organization.

DENTISTS ASKED TO AID IN SEARCH FOR MISSING GIRL

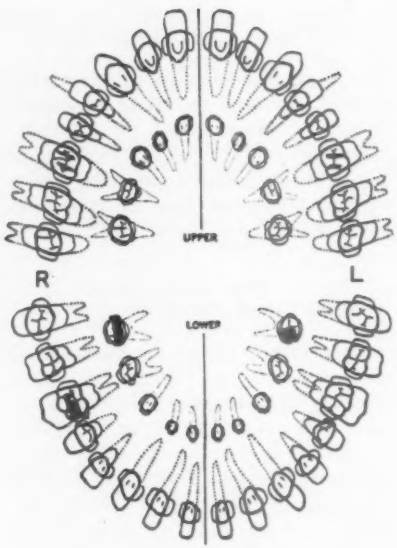
Ten year old Connie Smith, who has been missing from a summer camp near Salisbury, Conn., since July 16, is being

Connie Smith

sought by Connecticut police. Her description follows :

Five feet tall; weight approximately 85 pounds; blue eyes and brown hair; long, well cared for fingernails; slight scar under right nostril; flat feet; unusually long arms; nearsighted, but broke glasses while at camp; loves animals, especially horses; has lived on a Wyoming ranch most of her life.

Supernumerary tooth between upper right and left central incisors extracted January, 1949, and space closed; caries R-14-MO-A, May 1950; caries L-6-0-A, R-6-0-A, R-13-MOD-A deciduous and L-13-MO-A deciduous,



November 1950; prophylaxis, February 1952. Occlusion good. Permanent cuspids were beginning to erupt in February of 1952.

Information on Connie Smith may be sent to Commissioner Edward J. Hickey, Connecticut State Police Department, Hartford, Conn.

Also . . . The Department of Defense has asked for the induction of 383 dentists in January, the largest monthly call to date. . . . Rudolph Friedrich, chairman of the Council on Federal Dental Services, represented the Association at a meeting November 23 with the Department of Indiana of the American Legion. This was the first of a series of meetings between the Legion's state groups and groups interested in veterans' health. . . . T. J. McDermott of Cleveland was re-elected vice-chairman of the Council on Legislation during its meeting in Washington, D.C., November 14-16. . . . Daniel F. Lynch of Washington, D. C., attended a recent meeting of the reserve consultants to the Navy's Bureau of Medicine and Surgery. Dr. Lynch is the consultant in oral surgery. . . . The Northwestern University Cleft Palate Institute received a grant of $5,000 recently from the Chicago Community Trust, a charitable foundation. The funds will be used for the renovation and enlargement of the three year old Institute. . . . Max E. Soifer of Hartford, Conn., has been named editor of the Connecticut State Dental Association, succeeding Jesse J. Englander of Bridgeport, recently elected to the Board of Governors.

Washington News Letter

The change in government which American voters ordered when they went to the polls November 4 will soon be translated into the realities of new faces, new policies and new ideas of importance to dentistry and dentists. A Republican-controlled Congress will be convened the first week of January, to be followed by the inauguration of a Republican President and the appointment of numerous officials in the government's executive branch, from Cabinet rank on down.

If this phenomenon of political transition seems remote from the practice of dentistry, its significance comes into sharper focus when one considers some of the problems that will confront the new Administration and the new leaders on Capitol Hill. For example:

The "doctor draft law": Shall it be continued in its present form, amended, or permitted to vanish from the statute books on June 30, 1953?

Federal responsibilities for health care of veterans: Shall federal health services, including outpatient dental services performed by private practitioners on a fee basis, be curtailed or expanded?

Financial assistance to nongovernmental dental research and to dental education: Should Federal aid be continued and even enlarged or should it be cut?

At stake, too, are such actions as amending the tax laws to permit nonsalaried dentists who are not covered by social security to set aside a fixed amount of tax-exempt income each year for a retirement fund; widening the social security laws to include provisions for permanent and total disability insurance; subsidizing voluntary prepayment plans to effect lower premiums or increase benefits, or both.

It is still too early, of course, to gain even a vague idea of the ultimate disposition of these problems. Major factors are the temper of Congress, the international situation and the nature of the legislative program to be presented by President-elect Eisenhower.

One thing seems reasonably certain: Projects requiring large federal appropriations will have to run a very rugged gauntlet because it is evident that economy will be a watchword of the new Administration. Accordingly, chances do not seem bright for large subsidies to professional education, public health agencies and prepayment plans.

On the other hand, prospects are fairly good for widening social security benefits, streamlining federal medical activities, liberalizing income tax laws and making other changes which can be accomplished with a minimum drain upon the Treasury.

Incidentally, the new 83rd Congress will lose two dentist members and gain one. The addition is Rep. George S. Long (D., La.), a brother of the late Huey Long and an uncle of Sen. Russell B. Long. Gone from the House of Representatives will be Rep. Walter E. Brehm (R., Ohio) and Rep. Roy O. Woodruff (R., Mich.). Both decided to retire from Congress.

PUBLIC LAW 779

Complexities of the so-called doctor draft law, which is due to expire next June unless Congress extends it, were increased in November when the United States Supreme Court agreed to take up the Orloff case. A writ of *certiorari* was granted to Stanley J. Orloff, assuring him of a review of the merits of his contention that his induction into the Army was illegal because he is not being utilized in a professional capacity.

Although Selective Service headquarters in Washington is reluctant to furnish details, it is known that one or more dentists are contesting induction proceedings in state courts, though not necessarily on the same grounds as Dr. Orloff, who is a New York psychiatrist. The Supreme Court's future decision, therefore, will have an important bearing on these other cases and, far more important, will influence Congressional action with regard to amendment or termination of the special draft law.

To date at least 13 dentists, seven physicians and one veterinarian are known to have been inducted into the Army as privates. With the exception of Dr. Orloff and possibly two or three dentists, all of them now have successfully applied for commissions.

The lower federal courts rejected Dr. Orloff's argument that he is being illegally detained because the military is not employing him as a medical practitioner. Should the Supreme Court uphold the petitioner, the Army apparently would have no choice but to give Dr. Orloff a discharge or assign him to duties normally fulfilled by medical officers. The constitutionality of the doctor draft law, which has been characterized as discriminatory legislation against certain professions, is not an issue in the case.

Current Literature

JOURNAL OF DENTAL RESEARCH
August 1952

THE EFFECT OF THE CHANGING DENTITION ON MASTICATORY FUNCTION

F. R. Shiere and R. S. Manly, p. 526.

An investigation was made of 400 children from 6 to 15 years of age in order to determine the effect of changing dentition on masticatory function. Masticatory performance, swallowing threshold, food platform area and the maximum biting force were determined on both sides of the dentitions. It was possible to predict masticatory efficiency from masticatory performance with considerable accuracy. The masticatory performances with peanuts, P_p, were well correlated with the performances with carrots, P_c, with efficiency, E_p, and with swallowing threshold, U_p.

The masticatory efficiencies of the children extended over a wide range; the average efficiency was about half that of adults who had all teeth present except the third molar. The first and second permanent molars did not improve masticatory function immediately after eruption, but efficiency gradually increased over a period of three to four years. Efficiency declined after age 10 and rose again by age 14 probably because of the time required for the recently erupted teeth to become functional.

VARIATIONS IN STRUCTURAL MORPHOGENESIS OF THE HUMAN FACE AND JAWS

Samuel Rabkin, p. 535.

THERMAL INJURY TO NORMAL DOG TEETH: IN VIVO MEASUREMENTS OF PULP TEMPERATURE INCREASES AND THEIR EFFECT ON THE PULP TISSUE

V. F. Lisanti and H. A. Zander, p. 548.

There has been much speculation, and empiricism as well, regarding pulp reaction to heat. An apparatus was designed to apply measured temperatures to the floor of cavity preparations in teeth and to determine the resultant increase in temperature of the pulp tissue proper. This apparatus consisted of a copper thermode machined to the diameter of a no. 560 fissure bur, mounted on the heating element of a soldering iron. A variac and a General Electric voltage stabilizer controlled the temperature. A thermocouple (end area .072 mm.^{2}) set in a cold end junction and connected to a millivoltmeter was used for measuring temperature increase within the pulp tissue. The alignment of the thermocouple and heat source was accomplished by the use of a threaded yoke. This apparatus was used on 168 sound teeth of dogs. Histologic sections were prepared to show the effect of heat on the pulp after varying periods of time.

The temperature increase of the pulp tissue proper is a fraction of the temperature applied to the floor of the cavity preparation. The greater the bulk of dentin between the pulp and cavity floor, the less the temperature increases in the pulp. Dentin appears to be an effective insulating material.

Normal dog pulps react to temperature applications of 125° to 600° F. by alterations in the odontoblastic layer, blister formation and varying inflammatory changes. All pulps showed healing after thermal injury regardless of the temperature applied.

THE EFFECT OF SINGLE DOSES OF IRRADIATION UPON THE TISSUES OF THE UPPER RAT INCISOR

H. Medak, M. Weinreb, H. Sicher, J. P. Weinmann and I. Schour, p. 559.

In a study of the upper incisors of 59 white rats, 30 to 90 days of age, the basal ends of the incisors were irradiated with a single dose of roentgen rays varying from 1,000 to 4,000 r.

After low doses (1,000-2,000 r), the changes were localized at the labial part of the odontogenic zone and consisted of edema, dentin hypoplasia, formation of osteodentin, waviness of the dentinoenamel junction and shallow enamel hypoplasia.

After high doses (3,000-4,000 r), the changes at the basal end of the incisor exhibited a destructive and a regenerative phase. The destructive phase consisted of edema and cystic changes, destruction of odontoblasts, formation of osteodentin, cessation of pulpal

growth and of eruption and the alteration of the enamel organ into reduced enamel epithelium.

The regenerative process, usually limited, depended on the presence or absence of viable elements in the odontogenic epithelium. It consisted of the organization of cysts, proliferation of the odontogenic epithelium and the formation of a new incisor.

CLEANING EFFECTIVENESS OF DENTIFRICES

Grant Van Huysen and Thomas M. Boyd, p. 575.

By a photographic method for evaluating the effectiveness of dentifrices, a dentifrice containing insoluble sodium metaphosphate proved more effective than dentifrices containing chalk, tricalcium phosphate or dicalcium phosphate.

ORIGIN OF ENAMEL DROPS AND CEMENTICLES IN THE TEETH OF RODENTS

Viktors Kalnins, p. 582.

SALIVARY BACTERIA. III. THE PATHOGENICITY OF ORAL STAPHYLOCOCCI

Arnold J. Singer, p. 591.

A study of the gram-positive micrococci of the oral flora was undertaken to determine the incidence of staphylococci among these organisms. In a group of 53 individuals studied, staphylococci were isolated from the saliva of 52 subjects.

The isolated organisms were studied for pigment, coagulase, hemolysin and urease production, mannitol fermentation, gelatin liquefaction and necrotoxigenesis. It was found that the staphylococci isolated from the saliva showed the same vagaries of biochemical properties characteristic of those organisms isolated from other sources. The various criteria of pathogenicity were of no value in classifying those organisms.

It was also found that the presence of urea in the medium of ureolytic toxigenic organisms caused an inhibition or destruction of the toxic metabolites. Urea had no effect on the toxigenesis of urease negative toxigenic bacteria, nor did it affect nontoxigenic organisms. Thus the ability of urea to render the filtrates of toxigenic staphylococci innocuous is dependent on urease production by the organisms.

ROENTGEN STUDIES OF THE MAXILLA AND MANDIBLE IN SICKLE-CELL ANEMIA

I. B. Robinson and B. G. Sarnat. Radiology 58:517, April, 1952.

No previous studies have been published on the roentgenographic findings in the jaws of patients with the sickle cell type of anemia. This paper is a preliminary report of such studies on 22 patients with proved sickle cell anemia.

Generalized osteoporosis was found in the jaws of 18 patients of this group. Only three of these patients showed long bone changes and only one showed skull changes. This finding indicates that dental roentgenograms should be taken to supplement long bone studies, although an unusual degree of osteoporosis may not necessarily be pathognomonic for sickle cell anemia.

Heyl G. Tebo

PLASTIC SURGERY: HARELIP AND CLEFT PALATE

David Fisher and Henry C. Britton. New England J. Med. 245:179, 215, August 2, 1951, and August 9, 1951.

Some background in surgical history and etiology is necessary for a full understanding of the cleft palate problem. A cleft lip should be closed during the first few months of life, as early as the first 24 hours if the baby is healthy. There is a great difference of opinion as to the proper time for palatal surgery. For the best results in speech, palatal closure should be effected between the ages of 18 and 24 months. If possible, the operation should be a single one since the evidence on growth disturbances seems to indicate that multiple operations inhibit middle face growth.

Undernutrition and anemia are not uncommon in patients with a cleft palate or a cleft lip. Feeding difficulties must be eliminated before any operation is performed.

The dental problems for these patients are manifold: caries susceptibility usually is greater; orthodontic assistance is needed at an early age and may have to be continued into puberty; if normal tooth relationships are to be maintained, prosthetic appliances frequently are necessary. This latter phase of rehabilitation has come to the fore as a result of consistent failure of early surgical technics.

The problems in speech therapy include the cleft palate speech *per se* and associated speech defects such as nasality and articulation. The speech therapist, an important member of the cleft palate team, does not favor late closure of the palate because after the

age of three secondary speech and personality defects complicate the rehabilitation problem. Under any circumstance prognosis is poor unless a child is given an opportunity for self-respect by being made to feel that he is an essentially normal member of society.

T. M. Graber

THE EFFICACY OF CARIES CONTROL MEASURES

Noel D. Martin. Austral. J. Den. 55:247, August, 1951.

Measures for the prevention of dental caries in general use today are (1) oral hygiene, (2) impregnation, (3) dietary control and (4) use of fluorides. Numerous publications, many of which are recent, have appeared on these subjects, especially on the use of fluorides.

The following is a summary of the effectiveness of these preventive measures:

1. Simple oral hygiene can materially reduce the incidence of new dental caries in young adults; it is less effective for dental caries in children. The use of a dentifrice containing dibasic ammonium phosphate and urea, contrary to what was expected from *in vitro* studies, has no clinical effect. Penicillin incorporated in a dentifrice, 500 units per gram, reduces caries activity in children by nearly 60 per cent.
2. Impregnation of the enamel by the Gottlieb technic is ineffective.
3. Individual dietary control may be successful in cases of rampant dental caries.
4. Fluorides are effective in reducing dental caries incidence. Topical applications reduce newly carious tooth surfaces by 40 per cent. Fluoridation of communal water supplies is a safe, economical and effective method for partial mass control of dental caries.

D. S. Chernausek

THE AMMONIA AND INORGANIC PHOSPHORUS CONTENT OF THE SALIVA IN RELATION TO DIET AND DENTAL CARIES

Mervyn W. Evans, Austral. J. Den. 55:264, August, 1951.

Ammonia and inorganic phosphorus are the only two components found in greater concentration in saliva than in blood, and this indicates that these substances in the saliva play a role in the prevention of caries. Possible mechanisms are discussed.

An analysis of the saliva of 208 patients revealed that the ammonia and inorganic phosphorus concentrations show an increase as dental caries increases. Although a reverse relationship would be expected, the results obtained could be explained on the basis that the higher ammonia and inorganic phosphorus values found as dental caries increased may be the result of a reflex in the mouth condition itself calling forth a greater percentage of protective substances, the trigger for the reflex being a certain acid concentration in the mouth.

The high ammonia and phosphorus concentrations found in the saliva of edentulous patients is evidence that the production of these materials is not caused by putrefactive processes associated with caries or periodontal disease. However, no explanation is offered for the presence of greater amounts of these substances in the saliva of edentulous patients, who theoretically are not in need of the suggested protective mechanisms, than in saliva from any other group.

Edith Z. Helman

THUMB-SUCKING AND THE ORAL STRUCTURES

J. H. Sillman. J. Pediat. 39:424, October, 1951.

The teeth and their investing tissues develop between two important muscular forces; namely, vigorous pressure by the tongue on the lingual sides of the dental arches and the restraining influence of the lips and cheeks. Any pressure habit, such as thumbsucking, if continued long enough, may be a dominant factor in disturbing the normal balance between the forces mentioned and may cause malocclusion of the teeth and facial deformity.

The conclusions from a study of 8 instances of thumbsucking are: (1) that if the habit is discontinued before the child is 4 years old, the malocclusion already caused by the thumbsucking may be spontaneously corrected without orthodontic aid; (2) that spontaneous correction is particularly noticeable in patients who have "good formation," that is, no other occlusal disturbances; (3) that in cases of "poor formation," corrective orthodontic treatment usually is necessary. There are, however, instances in which prolonged thumbsucking appears to cause no harm.

Serial studies were recorded, from birth to 14 years of age, of a group of 60 children, of whom 20 were thumbsuckers. Records were made before thumbsucking started, while it was in effect and after it stopped. The following conclusions were reached: (1) It is important to differentiate between the effect on the dentition of thumbsucking and the effect due to other factors. (2) Thumbsucking can displace teeth but does not seem to affect the molar relationship. (3) Thumbsucking is prone to affect the dentition of patients with

poor bites but has little or no effect on that of patients with good bites. (4) During the eruption of the deciduous teeth the physiologic urge to bite is part of the oral development and should not be repressed. (5) Children can be aided to stop thumbsucking by being made physiologically and psychologically ready to assume appropriate responsibility. (6) Children are responsive to factual information and are impressed by evidence as seen in serial casts of their own teeth. (7) Parental interference entrenches thumbsucking, prolongs its duration, increases its force and thus aggravates a poor formation.

Charles R. Baker

HEMORRHAGE

C. C. Croker. D. J. Australia 24:2, April, 1952.

Hemorrhage is classified variously: (1) as arterial, venous or capillary; (2) as external or internal; and (3) according to the time of occurrence of bleeding as primary, intermediate or secondary.

In this study of hemorrhage the physiology of hemostasis is explained in detail, the coagulation theory according to Morawitz is presented and the general and local symptoms of hemorrhage are reviewed. The following factors must be considered in the treatment of hemorrhage: (1) arresting the hemorrhage, (2) maintaining the blood supply to the brain and (3) restoring the blood pressure to normal. The most effective of the various methods for hemorrhage control must be selected.

The control of bleeding in dental practice is an important aspect of the study of hemorrhage. There are useful tests that enable a practitioner to ascertain the nature of the hemorrhagic condition of a patient. Two schemes in particular make use of these tests as an aid in diagnosis.

R. J. Shankle

THE APPLICATION OF ENGINEERING METHODS TO ORTHODONTICS

Alexander Sved. Am. J. Orthodont. 38: 399, June, 1952.

The application of engineering methods to orthodontic problems is not new. In the past many attempts were made to standardize therapeutic procedures on the grounds that the orthodontic problems are basically biologic and not mechanical in character. Today, however, it is generally accepted that while orthodontic problems have a biologic background therapeutic measures are entirely mechanical in nature.

The mechanical procedure presupposes a knowledge of normal form; the mechanical phase of orthodontics may be divided into three distinct groupings: (1) study of normal form, (2) correlation of the abnormal and normal forms and (3) study of mechanical devices used for the correction of abnormalities.

The fact that authorities differ greatly was proved by the response from a number of dental authorities to whom an identical set of artificial teeth was sent with the request that they set up those teeth in wax in what each believed to be the normal arch. If the shape of the final arch is left to individual judgment, it is obvious that it makes a great difference who treats an orthodontic patient. Fortunately there is a method of arch predetermination that eliminates errors due to personal concept. The character of an arch is determined by the characteristic angle, which is constant and does not change in an individual during growth. By measuring this angle before treatment is begun, it is possible to predict the probable shape of the finished dental arches after treatment. According to the method which was devised, the malocclusal and normal occlusal arch outlines were related to each other so that the difference between the two arch outlines indicated the amount and direction of the necessary changes.

William F. Ford

PERIODONTIA FOR THE GENERAL PRACTITIONER

J. Monahan Lewis. D. J. Australia 24:55, April, 1952.

The initial lesion of periodontal disease is caused by bacteria which destroy the epithelial lining of the gingival crevice. A purulent exudate and bleeding are typical signs of the disease when it is well established. Bony destruction and pocket formation take place as the disease progresses. The lesion itself is within the pocket *per se*. Most patients possessing this condition are unaware of its presence because the initial lesion heals rapidly. The gingivae may appear to be healthy although deep pockets are present.

The two types of treatment are conservative and radical. Conservative treatment consists of the following: (1) removal of calculus, (2) correction of occlusal forces and (3) instruction in home care. Radical treatment consists of gingivectomy, which is the only satisfactory approach to the cure of the disease.

R. J. Shankle

SELENIUM AND DENTAL CARIES: INVESTIGATION AMONG SCHOOL CHILDREN OF OREGON

D. H. Hadjimarkos, C. A. Storvick and L. F. Remmert. J. Pediat. 40:451, April, 1952.

Since "bad teeth" was reported to be exceedingly common in persons living in a seleniferous area, data were collected on the relationship between selenium and dental caries. Determinations were made of urinary selenium concentrations in native-born school children reared in the counties of Clatsop and Klamath of Oregon, where both high and low rates of dental caries were known to exist. Previous studies indicated that the fluoride content of the drinking water, the availability of dental services and the quantity of candy bars and carbonated beverages consumed were not factors in the observed wide differences in caries incidence. A direct relationship was found between the prevalence of dental caries and the urinary selenium concentrations; it is possible that in a manner as yet unknown the trace element selenium may render the teeth more susceptible to caries.

J.A.M.A., July 19, 1952, p. 1164.

HEALTH MANPOWER IN THE UNITED STATES

Division of Public Health Methods: USPHS. Pub. Health Rep. 6:67, June, 1952.

This summary of the latest data on numbers in the health professions is based on counts and estimates collected by the various health professional associations.

The *American Medical Directory* lists a total of 201,277 physicians. Approximately 151,000 are in active private practice. In 1949 the ratio of practicing physicians to population ranged from 91 per 100,000 population in the South to 158 per 100,000 in the Northeast. The ratio of all physicians to population was lower in 1949 than at the beginning of the century.

According to the *American Dental Directory,* there were about 87,000 dentists in the United States--57 dentists to 100,000 population. This is about the same ratio as in 1930.

Nurses outnumber any other single group of health workers. In 1950 active graduate nurses numbered about 322 300. Between 1920 and 1940 the number of graduate nurses doubled. Since 1940 the number in active service has remained fairly constant. Reports on other personnel include about 15,000 veterinarians and 5,000 sanitary engineers on active duty in 1950.

Frank C. Cady

PROGRESS IN SCHOOL DENTAL PROGRAMS

Donald J. Galagan. Am. J. Pub. Health 42:834, July, 1952.

The gradual advance in the control of dental caries from the public health aspect has been publicized. Dentists are receiving better training in children's dentistry; school dental personnel are being paid slightly higher salaries to attract more dentists to school programs. Recently, the use of medicated dentifrices, the local application of fluorides, the utilization of lay groups to advance dental health programs and better teaching in methodology and resource materials, all have been creating a feeling of success in the battle against caries.

Seven hopeful signs in the field of dental health are: (1) increase in number of school and community dental programs, due in part to national topical fluoride demonstrations; (2) increase in quality of these programs as well as in their quantity; (3) use of auxiliary personnel in public programs; (4) change in concept of dental health education on the part of the dental profession with a greater desire to let trained educators produce material based on scientific information supplied by the profession; (5) the attempt to make school hygiene programs intellectually honest by removing candy counters and soft drink machines from school buildings; (6) the practice of excusing children from school to keep bona fide dental appointments; and lastly (7) increased knowledge of preventive measures.

These signs, though a proof of accomplishment, are really indications of progress in methodology and working tools only. Perhaps the means has been confused with the end. The improvement in technics should ensure a much greater accomplishment in combating and reducing dental caries. No matter how optimistically the new methods are viewed, in the end the question must be answered: What have they accomplished.

H. S. Dwyer

Book Reviews

ATLAS OF HUMAN ANATOMY

By M. W. Woerdeman. Two volumes. Index. Price $5.50 each volume. Philadelphia, The Blakiston Co., Vol. I, 1950 and Vol. II, 1951.

The author states that although this work was prepared primarily for medical students, he hoped that it also would prove of value to practitioners. The plates can be of value to either group, but—as for all atlases—they will require the supplementary descriptions contained in a good textbook of anatomy.

Originally planned as a three volume work, the material of the last two volumes apparently was culled and compressed into a single volume. There are 512 plates in volume I and 642 plates in volume II, all clearly produced on excellent hard paper. Volume I covers the entire locomotor apparatus and volume II, all other divisions. The figures are predominantly black and white. The index is complete. The terminology is BNA, usually in Latin but often enough translated for the non-Latin scholar.

Dentists will be most interested in volume II, which contains 85 plates that deal with the mouth and jaws and many excellent drawings of teeth, both deciduous and permanent. In this volume the vascular system is done in a helpful manner. The vessels are in black on transparent muscle, bone and other related parts. The same plan is employed for certain parts of the nervous system.

In volume I the bone drawings are well done and natural in appearance; however, in some places one wishes that labeling were more complete.

Karl L. Vehe

ZAHN-, MUND- UND KIEFERHEILKUNDE IN VORTRÄGEN VOLUME 2: (CARE OF JUVENILE TEETH)

Edited by Gustav Korkhaus. 88 pages with 109 illustrations. Price 12.—DM. Munich, Carl Hanser Verlag, 1950.

This volume consists of six papers by five participants in the Medizinisch-Wissenschaftlichen Gesellschaft für Zahn- und Kieferheilkunde, held in Halle in 1949. Two papers were prepared by Ewald Harndt of the Dental Institute of Humboldt University, Berlin. In one paper he has assembled the various theories forming the basis for the treatment of deciduous teeth. In the other he demonstrates the existence of the periodontal diseases of the deciduous dentition. The remaining papers were prepared by members of the staff of the Dental Clinic, Martin Luther University, Halle.

The paper by Carl H. Plathner is concerned with practical questions in the treatment of the deciduous teeth. A statistical study of the so-called spirillosis Gins in children of beginning school age and the effectiveness of Rosodont P in inhibiting this organism is presented by Gisela Schützmannsky. The problem of thumb and finger sucking and the resulting malocclusion is discussed by Dorothea Neumann. Erwin Reichenbach reviews the question of when treatment of malocclusion and deformities of the maxillae should be initiated.

D. Washburn

ZAHN-, MUND- UND KIEFERHEILKUNDE IN VORTRÄGEN VOLUME 3: (ADVANCES IN DENTISTRY ABROAD)

Edited by Gustav Korkhaus. 158 pages pages with 190 illustrations. Index. Price about 12.—DM. Munich Carl Hanser Verlag, 1951.

The eight papers that make up this volume were prepared by five Swiss dentists for presentation before their German colleagues at the Bonner Fortbildungstagung, 1949. F. Riedener of Zurich describes an interesting procedure in which suction is used in cleaning root canals. C. T. Bonsack of Biel discusses pulp capping and alginate impression materials.

In three papers H. B. Conod of Lugano discusses the indirect inlay technic using electroformed copper models, the biomechanics involved in partial dentures and a system of partial denture construction based on biomechanical principles. D. Biaggi-Bachman of Zurich presents various methods for the anchorage of partial dentures which are supported by the mucous membrane and which do not have attachments posteriorly. A. Biaggi of Brugg explains the construction of partial dentures using the Biaggi attachment.

D. Washburn

ZAHN-, MUND- UND KIEFERHEILKUNDE IN VORTRÄGEN VOLUME 5: (COMPLETE DENTURE PROSTHESIS)

Edited by Gustav Korkhaus. 128 pages with 131 illustrations. Index. Price about 10.—DM. Munich, Carl Hanser Verlag, 1951.

This series of nine reviews and supplemental reports reflects the development of dental prosthetics in recent years and stresses the importance of biological and functional relationships in the preparation and insertion of full dentures. The papers were presented at the scientific session of the Deutschen Gesellschaft für Zahn-, Mund- and Kieferheilkunde in 1949 at Wiesbaden.

Erwin Reichenbach of Halle-Wittenberg and R. Ritter of Heidelberg have written on the biological foundati- of complete dentures. Gerhard Steinhart of Bremen discusses the importance of the form and function of the temporomandibular joint in the construction of full dentures. C. U. Fehr of Berlin and Hans Rehm of Freiburg im Breisgau review the various problems presented by patients for whom dentures are to be made. Surgical problems encountered are discussed by Karl Schuchardt of Hamburg. Hans van Thiel of Cologne and Rainer Strack of Tubingen discuss denture problems. The final paper by Gustav Korkhaus of Bonn is concerned with new impression materials and methods of taking impressions.

D. Washburn

LA THÉRAPEUTIQUE ORTHOPÉDIQUE FONCTIONNELLE DE LA FACE

By Edmond Muzy. Translation from the Italian into French and personal comments by Etienne Cadenat. Preface by Harold Chapman. 159 pages with 99 illustrations. No price listed. Paris, Julien Prélat, Éditeur, 1952.

The purpose of the TOF (functional orthopedic therapy) is to modify the morphology of the dento-jaw-facial unit so that it can fulfill its function. The modern concept of the TOF was initiated in 1870 by Kingsley with his device of a plate with an inclined plane and was scientifically demonstrated in 1902 by Robin with his monobloc.

For the achievement of the TOF, two distinct, complementary forces are at the service of the TOF: one, the vital force, and the other, the mechanical force—muscular, respiratory and phonetic. In treating the various facial malformations and deviations, all abnormal obstacles must be removed to allow the vital force to proceed to its business of correction, prevention and development.

The second part of this volume consists of practical applications of the more theoretical first part: individual exercises for muscle control and mechanical devices such as orthopedic activators and pressure, traction and expansion appliances for each type of clinical deviation. With these 100 pages the author hopes to awaken interest in functional orthopedic therapy as a science which, in his opinion, is just now crossing the threshold into medicine.

The ideas and procedures of each chapter are evaluated by the translator, who admits that his judgment is limited by his own experience. Although occasionally he approves of some appliance such as the muscle activator of variable thickness, he is inclined to be skeptical. He concludes that the real importance of the work is the opening up of new horizons, that "Tomorrow, without doubt, the orthodontist will be more of a pediatrician than a dentist," and that Muzy's little volume is making a turn in that evolution.

Grace Nichols

FUNKTIONELLE PROTHETIK (FUNCTIONAL PROSTHETICS)

By Walther Wild. 202 pages with 127 illustrations. Basel, Switzerland, Benno Schwabe and Co., 1950.

The realization of success in prosthetics presupposes not only a complete understanding of physiological processes, such as mastication and phonation, and a broad understanding of facial forms and expressions, but also a knowledge of the psychological processes. The completeness with which an individual can incorporate any prosthesis both mechanically and mentally into his being is the final test of success. "The patient must so assimilate the prosthesis that neither he himself nor his neighbor is aware of its existence." The prosthetist is largely responsible for this. Dr. Wild, who is director of the prosthetics department of the University of Zurich, had these points in mind when he wrote this book. Properly speaking, it is not a textbook. It contains no descriptions of procedures for making prosthetic appliances. The author plans to present such in another book. The book is divided into five parts.

Part I includes under "Prosthetic Appliances and Prosthetics Generally": therapeutic use of prosthetic appliances; organ and function; loss

of teeth and loss of function; the goal of prosthetic treatment; prosthesis (definition); prosthetics.

Part II includes under "The Masticatory Function": the organ of mastication; the muscles of mastication; forces of mastication and stress of mastication; the influence of force of mastication; individual biological factors; roles of the tongue and salivation; innervation; action of nerves in mastication; chopping bite and grinding bite; mandibular movements and masticatory movements; the temporomandibular joint; movements of the temporomandibular joint; occlusion; essential masticatory movements; coordination of the tongue and mandibular movements during mastication; the nerve action in speech and mastication; articulating movements; abrasion as indications of movements; methods for determining mandibular and masticatory movements; successful prosthetic treatment; kinematographic records of the movements during mastication of the mandible with a complete dentition. Under "The Phonetic Function" are included: sound formation; loss of teeth and phonetics; prosthetics and phonetics.

Part IV is called "The Facial Expression" and includes: the face as a whole; orientation lines and proportions; the anthropological face index; the division of the facial height into three parts and the division into two parts according to the golden mean; the visibility of the teeth; lines and forms of the anterior teeth; anterior teeth and age; the dentition as a support for the lips and rest for the mandible; the vertical dimension and the determination of the correct vertical dimension in the edentulous; constitutional types and prosthetics; the selection of artificial teeth and the design of the prosthesis.

Part V is entitled "Psychology and Prosthetics."

The sections on the masticatory function and physiognomy account for more than half the book.

An extensive bibliography gathered from the world dental literature is included.

Donald A. Washburn

LIPPINCOTT'S HANDBOOK OF DENTAL PRACTICE

Edited by Louis I. Grossman. Second edition. 503 pages with 388 illustrations. 4 color plates. Index. Price $10. Philadelphia, J. B. Lippincott Co., 1952.

In this volume, presented by the editor as a manual and reference book, 19 distinguished authors offer concise descriptions of technics used in dental practice. Various dental diseases are briefly covered to help readers review and refresh their understanding of dental pathology. Many illustrations clarify the subject matter: however, more colored illustrations would have been desirable. The large type will please the reader.

Part I, "Diagnosis and Treatment," includes prevention and control of dental caries, oral diagnosis, roentgenologic interpretation, orthodontics, periodontics, endodontics, diseases of the mouth, prescription writing, anesthesia and exodontics.

Part II, "Restorative Dentistry," presents the following topics: gold inlay restorations, amalgam, silicate, direct resinous and silicate restorations, periodontics, crown and bridge restorations, partial and complete dentures.

J. M. Wisan

PRACTICE OF DENTISTRY

By J. C. G. Fitz-Hugh. First edition. 302 pages with 121 illustrations. Index. Price $8. New York, Richard R. Smith Publisher, Inc., 1952.

For a single author to undertake the preparation of a textbook to cover the practice of dentistry is indeed a colossal task. Where to begin and where to end would be the problem of any writer who attempts to embrace such a subject, so broad in its present day aspect and so diverse in its implications.

In the 20 chapters, the author has presented his methods of approach and experiences gathered from actual practice extending over a period of 46 years. Generally speaking, this is an elementary and rather superficial presentation of dental practice. Unfortunately, the author failed to omit those practices and procedures made obsolete by dental progress. The illustrative features of the book are poor. It is also regrettable that he has not followed the use of terms proposed by the Committee on Nomenclature of the American Dental Association as closely as a modern textbook on dentistry should.

It is doubtful whether a slight coverage of the many topics discussed is suited to the day-by-day requirements of the contemporary general practitioner in need of more detailed information. The contents of a book of this character would naturally be subjected to much criticism. Viewed from the standpoint of the present methods of practice, there is little that may be considered new or original in the text.

Few readers will agree with the writer's position on every problem that engages his attention; many will dispute his precepts and

premises. Because most of its pages represent one man's opinions, its value will depend upon the attitude of the reader, and his discernment of the suggestions that can be applied to his own dental practice.

E. Alan Lieban

THE ADOLESCENT AND HIS WORLD

By Irene M. Josselyn. 124 pages. Price $1.75. New York, Family Service Association of America, 1952.

This monograph is designed primarily for those who help to improve the interpersonal relationship of parents and adolescents. The author points out a direct relationship between physical and psychological processes. She considers adolescence as a stage of emotional growth in which many conflicts of childhood return to be solved. It is also a period of new problems created by the physical changes of maturing.

The process of adjustment is viewed in the manner of the solving of a jig-saw puzzle. At first the pieces lie chaotically in a heap. Then the picture is reconstructed into completion. It is the function of the adolescent to integrate the physical with the mental and social as an harmonious unit. Regardless of whether the adolescent is struggling through his problems alone or is aided from without, physical growth proceeds uninterruptedly. Unfortunately, physical adulthood is attained before adjustment is completed. Each aspect of the problem is evaluated effectively, but the integrative concept needs to be stressed for effective maturity.

I. Newton Kugelmass

VINYL AND RELATED POLYMERS—THEIR PREPARATIONS, PROPERTIES, AND APPLICATIONS IN RUBBERS, PLASTICS, FIBERS, AND IN MEDICAL AND INDUSTRIAL ARTS

By Calvin E. Schildknecht. 734 pages with figures and tables illustrated. Index. Price $12.50. New York, John Wiley and Sons, Inc., 1952.

This book can be recommended to those who desire a large amount of readily available basic information about plastics.

The technology, chemistry and physical properties of the most commonly used polymers are discussed in remarkable detail. There are more than 4,000 references to the patent and scientific literature. Considering the specialized character of the subject matter, the text is easy to read and understand.

In a diagram facing the title page, the plastics which are covered in the book are shown as derivatives of various chemical compounds; namely, styrene, coumarone-indene, acrylonitrile, acrylic esters, vinyl acetate, vinyl chloride, vinylidene chloride, ethylene, isobutylene and chloroprene.

A 77-page chapter is devoted to methacrylic and acrylic ester polymers, many of which are useful in dentistry. Three pages are devoted exclusively to dental applications. Acrylic filling materials are referred to only briefly.

There are numerous illustrations, charts, tables and structural formulas. Trade-named products are classified according to their chemical character. Methods of manufacture are illustrated and described. Physical constants of monomers and finished plastics are also reported.

SUOMEN HAMMASLÄÄKÄRISEURAN TOIMITUKSIA. FINSKA TANDLÄKARSÄLLSKAPETS FÖRHANDLINGAR. (PROCEEDINGS OF THE FINNISH DENTAL SOCIETY) SIXTIETH ANNIVERSARY ISSUE.

Editor-in-chief, Kalevi Koski. 69 pages with illustrations. Helsinki, Finland, Finnish Dental Society, 1952.

The 1952 Proceedings of the Finnish Dental Society reflects the current functions of that society and in addition pays tribute to Matti Äyräpää, father of Finnish dentistry. Although the Finnish Dental Society is 60 years old, the publication of Proceedings is slightly younger, having been instituted in 1904.

This year's volume, consisting of five major articles, is published both in Finnish and English. Kalevi Koski, editor-in-chief, presents a brief historical sketch of his society in an article entitled "Six Decades." In an article entitled "On the Influence of Antihistamines in Operative Procedures," Juuso Kivimäki concludes that histamine is the main factor in postoperative edema. Yrjö V. Paatero, writing on "Photo-pantomography," describes a technic which is primarily based on his earlier invention of pantomographic roentgenography enabling the roentgenographic reproduction on ordinary roentgen film of curved surfaces projected onto a plane.

The most pretentious article in the 1952 Proceedings is one by Mauri Pohto entitled "On the Effect of Antibiotic Substances on the Micro-Organisms Present in Dry Gangrenes." The author describes results of experiments conducted with penicillin, dihydro-

streptomycin, chloromycetin, aureomycin and terramycin. He concludes from his studies that, considering the potential uses of antibiotic substances in root canal treatment, penicillin and chloromycetin seem best suited to destroy the micro-organisms of dry gangrene. In a report entitled "Histological Studies on the Effect of Sodium Fluoride on Human Dental Enamel in Vitro," Arje N. Scheinin and Lauri O. Ruikka describe an attempt to show the relative changes in the permeability of the enamel following sodium fluoride treatment, using an ammoniacal silver nitrate solution as indicator. They report no evidence of such change. The concluding article consists of an interesting biographical sketch by Per v. Bonsdorff of Matti Äyräpää, father of Finnish dentistry. Historically and scientifically this year's Proceedings of the Finnish Dental Society is a distinct contribution to dental literature.

BLAKISTON'S ILLUSTRATED POCKET MEDICAL DICTIONARY

By Normand L. Hoerr & Arthur Osol. First Edition. 1,005 pages with 24 plates. With Index the price is $3.75; without Index, $3.25. New York, The Blakiston Co., 1952.

The publication of a medical dictionary is always an event of moment to those interested in medical, dental and other health fields. As no strictly dental dictionary is now in print, the dental profession is particularly interested in medical dictionaries which include dental terms. This new pocket medical dictionary is intended to meet the needs not only of the physician but also the nurse, dentist, pharmacist, laboratory technician and medical social worker. It contains over 33,000 entries.

Some of the definitions of dental terms will meet with the approval of the dentist but others may not be considered wholly satisfactory. The definition given for the dentist is "One who practices dentistry." The definition for the physician is "One who is authorized to practice medicine" and the definition of surgeon is "One who practices surgery. The term implies the possession of a medical degree and license and is used irrespective of the field or limitation of practice."

The definition of dental occlusion likewise could be improved. The definition given is "The full meeting or contact in a position of rest of the masticating surfaces of the upper and lower teeth; erroneously called articulation teeth." The definition of dental anesthesia is "Anesthesia of the teeth for dental operations." Several other dental terms likewise could be improved but many are completely satisfactory.

The inclusion of trade-mark names of products in this dictionary is useful; so too are the short biographical sketches of physicians. It is unfortunate that similar information about dentists is not included.

In addition to the 33,000 entries with definitions, the book contains a valuable appendix with many tables, on such subjects as the arteries, bones, muscles, nerves and normal values of blood constituents. Tables of diets, elements, hormones, medical signs and symbols and common Latin and Greek terms are included. Though this book does not remove the need for a comprehensive up-to-date dental dictionary, it would be useful to the dentist for its dental terms, medical definitions, extensive tables and illustrative plates.

Josephine P. Hunt

Deaths

Alessandra, Matthew C., Houston, Texas; died September 15; aged 41.

Angelo, John C., Tyler, Texas; Texas Dental College, Houston, 1929; died March 24; aged 46.

Austbo, Merritt O., Blackwell, Okla.; School of Dentistry, Washington University, St. Louis, 1929; died September 27; aged 45.

Benson, Charles W., Duluth, Minn.; Chicago College of Dental Surgery, Loyola University, 1901; died September 24; aged 76.

Black, James A., Houston, Texas; Dental School, Northwestern University, 1895; died September 5; aged 80.

Blaustein, Clara K., Mount Vernon, N. Y.; College of Dental and Oral Surgery, New York, 1914; died June 16; aged 65.

Boos, Jacob B., St. Louis; School of Dentistry, St. Louis University, 1911; died September 16; aged 63.

Botkin, Robert G., Indianapolis; School of Dentistry, Indiana University, 1926; died September 9; aged 49.

Boyer, William T., Muskegon, Mich.; Chicago College of Dental Surgery, Loyola University, 1903; died August 29; aged 71.

Bridge, John C. F., West Hartford, Conn.; Dental School, Tufts College, 1892; died September 11.

Brown, Delaney A., North Fork, W. Va.; Dental Department, Meharry Medical College, 1923; died March 14.

Case, Rolland T., La Crosse, Wis.; Dental School, Northwestern University, 1900; died September 18.

Chamberlain, Raymond, Whittier, Calif.; College of Dentistry, University of Southern California, 1937; died October 12; aged 42.

Claussen, Richard E., Milwaukee; American College of Dental Surgery, Chicago, 1895; died September 4; aged 77.

Cohen, Isaac S., Philadelphia; School of Dentistry, Temple University, 1922; died September 21; aged 53.

Cone, Elbert E., Seattle; Chicago College of Dental Surgery, Loyola University, 1903; died September 26.

Curran, John J., Minneapolis; College of Dentistry, Creighton University, 1913; died September 16; aged 61.

Dannewitz, Lyle F., Plano, Ill.; Chicago College of Dental Surgery, Loyola University, 1918; died September 24; aged 56.

Deeble, Albert L., Webster, S. D.; Dental School, Northwestern University, 1912; died August 25; aged 62.

Dennis, Frank, Jewett, Ohio; School of Dentistry, Western Reserve University, 1907; died June 3, aged 71.

Desenis, Neil G., Chicago; Chicago College of Dental Surgery, Loyola University, 1924; died September 24; aged 51.

DeVilliers, Matthew S., Detroit; College of Dental Surgery, University of Michigan, 1923; died September 22; aged 56.

Dubuisson, George W., St. Joseph, La.; School of Dentistry, Tulane University, 1919; died September 3.

Dutton, Earl T., Temple City, Calif.; College of Dentistry, University of Southern California, 1924; died July 12.

Ellis, Roy H., Okmulgee, Okla.; School of Dentistry, Washington University, St. Louis, 1898; died July 29; aged 74.

Feiner, Julius, Harrison, N. J.; New York College of Dentistry, 1894; died August 27; aged 80.

Field, Fredell E., Sioux Falls, S. D.; United States Dental College, Chicago, 1892; died September 7; aged 86.

Forbes, Clarence A., Inglewood, Calif.; College of Dentistry, University of Southern California, 1925; died September 10; aged 53.

Frisch, John G., Madison, Wis.; Dental School, Marquette University, 1922; died September 11; aged 53.

Haberle, Herbert C., Hinsdale, Ill.; Dental School, Northwestern University, 1941; died September 17; aged 43.

Hardin, Richard H., England, Ark.; Atlanta Dental College, 1908; died August 22; aged 72.

Hart, Albert B., New London, Conn.; died September 6.

Hedback, William N., Minneapolis; Dental Department, Milwaukee Medical College, 1902; died June 23.

Ingersoll, Raymond B., Atlantic City, N. J.; School of Dentistry, Temple University, 1924; died September 24; aged 60.

Jernigan, George C., Rector, Ark.; School of Dentistry, St. Louis University, 1913; died September 9; aged 68.

Katz, Arthur C., Detroit; Dental School, Marquette University, 1934; died October 1; aged 45.

Kennedy, Edward, New York; School of Dentistry, University of Pennsylvania, 1906; died August 3.

Kiley, Stanley L., Cleveland; School of Dentistry, Western Reserve University, 1925; died August 10; aged 54.

Kreis, Edward H., Galva, Ill.; Indiana Dental College, 1896; died September 11; aged 79.

Latimer, Claude S., Charleston, S. C.; Atlanta Dental College, 1902; died May 4.

Levy, Albert, Pittsburgh; School of Dentistry, University of Pennsylvania, 1918; died August 31.

Lieberman, Benjamin, Chicago; Chicago College of Dental Surgery, Loyola University, 1921; died July 17.

Locke, James D., Grand Rapids, Mich.; Chicago College of Dental Surgery, Loyola University, 1898; died July 13; aged 75.

Lockhart, John H., Honaker, Va.; died August 5; aged 84.

Longstreth, Ewert O., Elma, Iowa; College of Dentistry, University of Iowa, 1925; died July 15; aged 57.

Ludwick, Paul G., Lincoln, Neb.; College of Dentistry, University of Nebraska, 1919; died July 31; aged 54.

Lynn, Norman H., Spring Valley, Ill.; College of Dentistry, University of Illinois, 1923; died August 12; aged 53.

Maddox, Charles H., Charleston, W. Va.; Baltimore College of Dental Surgery, 1921; died June 25; aged 58.

Mann, Harry, Morbridge, S. D.; Dental School, Northwestern University, 1918; died May 16; aged 58.

Mathiott, George S., Cambridge, Ohio; College of Dentistry, Ohio State University, 1939; died August 20; aged 37.

Mathison, John N., Prentiss, Miss.; New Orleans College of Dentistry, 1900; died July 31; aged 78.

McCafferty, James B., St. Louis; School of Dentistry, St. Louis University, 1914; died August 7; aged 59.

McCorkle, Harry L., Algona, Iowa; College of Dentistry, University of Iowa, 1924; died June 3; aged 51.

McCormick, James J., San Francisco; College of Physicians and Surgeons, San Francisco, 1908; died August 26.

McCoy, James V., Meridian, Miss.; Atlanta Dental College, 1917; died in June; aged 64.

McCredie, Allen W., Fowlerville, Mich.; College of Dental Surgery, University of Michigan, 1903; died August 3; aged 70.

McMahon, Philip A., Lawrence, Mass.; Dental School, Tufts College, 1928; died April 16.

McTernen, Malcolm B., Andover, Mass.; Dental School, Tufts College, 1906; died August 27; aged 68.

Measor, Leonard G., Everett, Wash.; North Pacific College of Oregon, Portland, 1927; died July 24; aged 53.

Mecklin, Don A., French Camp, Miss.; New Orleans College of Dentistry, 1906; died May 6; aged 74.

Smith, DeWitt W., Greensburg, Kan.; Kansas City Dental College, 1910; died May 29; aged 65.

Smith, George T., Beattyville, Ky.; Louisville College of Dentistry of Centre College, 1902; died in June.

Smith, Rowe, Texarkana, Ark; School of Dentistry, Vanderbilt University, 1923; died October 10; aged 51.

Snyder, Lorenzo F., Portland, Ore.; School of Dentistry, North Pacific College of Oregon, 1915; died August 22; aged 61.

Sontheimer, Albert F., Rome, N. Y.; School of Dentistry, University of Pennsylvania, 1916; died April 4.

Steichen, Henry R., Dubuque, Iowa; Dental School, Marquette University, 1922; died September 1; aged 54.

Stewart, Charles R., Detroit; Baltimore College of Dental Surgery, 1899; died October 3.

Sullivan, Willis N., Everett, Wash.; School of Dentistry, St. Louis University, 1906; died September 4; aged 74.

Tetu, Arthur A., Sparrows Point, Md.; Baltimore College of Dental Surgery, University of Maryland, 1919; died July 17; aged 56.

Tevis, William A., McLeansboro, Ill.; Barnes Dental College, 1913; died April 28; aged 70.

Thomas, Eugene L., Burlington Junction, Mo.; Pennsylvania College of Dental Surgery, Philadelphia, 1898; died June 22; aged 75.

Thompson, Joseph D., Newton Highlands, Mass.; Baltimore College of Dental Surgery, 1900; died July 6; aged 76.

Thomsen, Johanne C., St. Paul, Neb.; College of Dentistry, University of Illinois, 1907; died June 6; aged 74.

Treanor, George R., Saginaw, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1903; died August 20; aged 77.

Turner, James A., Pawnee, Okla.; Birmingham Dental College, 1909; died August 4; aged 71.

Turrentine, Minor H., Douglas, Ga.; Baltimore College of Dental Surgery, University of Maryland, 1903; died July 9; aged 70.

Uhle, Frederick L., Bridgeport, Conn.; died July 15.

Van Cott, Enoch, Salt Lake City, Utah; Chicago College of Dental Surgery, Loyola University, 1903; died August 12; aged 74.

Van Wickle, Charles E., Asbury Park, N. J.; Philadelphia Dental College, 1905; died August 16; aged 69.

Vennesland, Gunnaf O., Chicago; Chicago College of Dental Surgery, Loyola University, 1917; died July 12; aged 70.

Vogel, William P., New York; New York College of Dentistry, 1889; died August 10.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Fourth Annual Session	Sept. 28-Oct. 1, 1953	Cleveland
Ninty-Fifth Annual Session	Nov. 8-11, 1954	Miami
Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 9-11, 1953	Montgomery	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska	July 22-25, 1953	Juneau	J. D. Smith	Box 134, Juneau
Arizona	Apr. 23-25, 1953	Tucson	E. M. Scott	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 5-8, 1953	Little Rock	D. M. Hamm	White Bldg., Clarksville
California	Apr. 13-15, 1953	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	Apr. 20-22, 1953	Los Angeles	C. A. Moss	903 Crenshaw Blvd., Los Angeles
Colorado	Oct. 4-7, 1953	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	May 20-23, 1953	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delware	Jan. 14, 1953	Wilmington	J. J. Ficca	2130 Lancaster Ave., Wilmington
District of Columbia	Mar. 15-18, 1953	Washington	K. H. Wood	202-1835 Eye St., N. W., Washington
Florida	Apr. 19-22, 1953	St. Petersburg	C. T. Brown	602 Citizens Bldg., Tampa 2
Georgia	Oct. 18-21, 1953	Atlanta	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii		Honolulu	J. H. Dawe	810 N. Vineyard St., Honolulu 17
Idaho	June 18, 1953	Sun Valley	J. F. Julian	206 Rogers Bldg., Idaho Falls
Illinois	May 11-14, 1953	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana	May 18-20, 1953	Indianapolis	E. E. Ewbank	Kingman
Iowa	May- 4-6, 1953	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 10-13, 1953	Kansas City, Mo.	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 7-9, 1953	Louisville	A. B. Coxwell	1976 Douglass Blvd., Louisville
Louisiana	Apr. 29-May 2, 1953	New Orleans	J. S. Bernhard	2515 Line Ave., Shreveport
Maine	June 25-27, 1953	Rockland	S. M. Gower	Box 27, Skowhegan
Maryland			E. L. Pessagno, Jr.	19 Medical Arts Bldg., Baltimore 1
Massachusetts	May 3-6, 1953	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan	Apr. 20-23, 1953	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Feb. 23-25, 1953	Minneapolis	C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi		Jackson	H. M. Campbell	102 Professional Bldg., Tupelo
Missouri	May 10-13, 1953	Kansas City	R. R. Rhoades	201 Merchants Bank Bldg., Jefferson City
Montana	May 7-9, 1953	Missoula	C. S. Renouard	304 Phoenix Bldg., Butte
Nebraska	May 11-13, 1953	Lincoln	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada	May 4, 5, 1953	Las Vegas	J. E. Ahlstrom	1150 Arizona, Boulder City
New Hampshire	June 11-14, 1953	Bretton Woods	F. E. Williams	814 Elm St., Manchester
New Jersey	April 22-24, 1953	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 24-27, 1953	Albuquerque	J. S. Eilar	Suite 7, Medical Arts Square, Albuquerque
New York	May 12-15, 1953	New York	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 17-20, 1953	Pinehurst	B. N. Walker	608 Liberty Life Bldg., Charlotte
North Dakota	May 24-27, 1953	Fargo	J. H. Lunday	302 Black Bldg., Fargo
Ohio			E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 19-22, 1953	Tulsa	D. Robertson	434 N. W. 13th St., Oklahoma City
Oregon	Mar. 2-4, 1953	Portland	H. C. Fixott, Jr.	Medical Dental Bldg., Portland
Panama Canal Zone	Dec. 9		F. D. Buckley	Box 293, Rodman
Pennsylvania	May 20-22, 1953	Atlantic City, N.J.	M.D. Zimmerman	217 State St., Harrisburg
Puerto Rico	Jan. 23-25, 1953	San Juan	A. Quiñones	San German
Rhode Island	Jan. 18-21, 1953	Providence	E. L. Bessette	1745 Broad St., Cranston 5
South Carolina	June, 1953	Greenville	J. R. Owings	7 Medical Court, Greenville
South Dakota	May, 1953	Rapid City	E. W. Elmen	Sioux Falls
Tennessee	May 11-14, 1953	Knoxville	W. L. McCulley	Brown Bldg., Cleveland

State	Date	Place	Secretary	Address
Texas	May 10-14, 1953	Houston	W. Ogle	3607 Gaston Ave., Dallas
Utah	Apr. 27-29, 1953	Salt Lake City	K. L. Dedekind	914 Medical Arts Bldg., Salt Lake City
Vermont	May 17-19, 1953	Woodstock	W. J. Reardon	Rutland
Virginia	May 4-6, 1953	Roanoke	J. E. John	804 Medical Arts Bldg., Roanoke
Washington	June 18-20, 1953	Yakima	F. J. Dingler	1502 Medical-Dental Bldg., Seattle
West Virginia	July 19-22, 1953	White Sulphur Springs	A. B. Drake	506 West Virginia Bldg., Huntington 1
Wisconsin	Apr. 6-9, 1953	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming		Casper	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 14, 1953*	Birmingham	M. D. Edwards	132 Adams Ave., Montgomery
Alaska	July 6-11, 1953	Fairbanks	J. H. Geyer	209 Goldstein Bldg., Juneau
Arizona			R. K. Trueblood	25 N. Second Ave., Glendale
Arkansas	June 22-26, 1953	Little Rock	H. O. Weatherly	205 Halter Bldg., Conway
California	Feb. 2, 1953	San Francisco	K. I. Nesbitt	507 Polk St., San Francisco 2
	June 22, 1953	Los Angeles		
Colorado	June 22-26, 1953	Denver	C. K Phillips	724 Republic Bldg., Denver 2
Connecticut			C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia	Jan. 5-9, 1953	Washington	W. T. Birthright	1835 Eye St., N. W., Washington 6
Florida	July 6-14, 1953*	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Georgia			S. H. Yarbrough	Medical Arts Bldg., Columbus
Hawaii			H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho			W. K. Adams	1624 Arlington, Caldwell
Illinois			W. A. McKee	503 Wood Bldg., Benton
Indiana			C. A. Frech	504 Broadway, Gary
Iowa	May 25-29, 1953*	Iowa City	H. M. Willits	719 Roshek Bldg., Dubuque
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky	June 8-11, 1953	Louisville	R. I. Todd	Western Union Bldg., Richmond
Louisiana			A. R. de Nux	Marksville
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland			H. Levin	3429 Park Heights Ave., Baltimore 15
Massachusetts			R. A. Barrette	Rm. 33 State House, Boston
Michigan	Jan. 26-30, 1953	Ann Arbor	J. L. Champagne	3714 W. McNichols Road, Detroit 21
	June 8-12, 1953			
Minnesota			F. A. Larson	1632 Washington St., N. E., Minneapolis
Mississippi	Jan. 5-7, 1953	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri	June 16-18, 1953		R. R. Rhoades	414 Central Trust Bldg., Jefferson City
Montana			V. J. Quinn	Box 865, Helena
Nebraska			H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada			G. C. Steinmiller	Suite 6, Masonic Temple, P. O. Box 2473, Reno
New Hampshire			D. J. Freese	4 Wall St., Concord
New Jersey	Dec. 1, 2**‡‡	Philadelphia	W. A. Wilson	150 E. State St., Trenton 8
	Dec. 3-5§	Trenton		
New Mexico	May 24-27, 1953	Albuquerque	J. J. Clarke, Sr.	Artesia
New York			D. W. Beier	23 S. Pearl St., Albany 7
North Carolina			F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota	July 13-17, 1953	Fargo	A. B. Crabtree	Ellendale
Ohio			H. B. Smith	322 E. State St., Columbus
Oklahoma			J. B. Cole	706 Asp St., Norman
Oregon	Dec. 8-11*	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
Pennsylvania	Dec. 1-3‡	Philadelphia	A. M. Stinson	Dept. of Public Instruction
	Dec. 3-5**			Box 911, Harrisburg
	Dec. 4††			
Puerto Rico			L. C. Coll	Box 9156, Santurce
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina			T. C. Sparks	1315 Pickens St., Columbia
South Dakota			O. Isaak	Tyndall
Tennessee	Dec. 10-15	Memphis	F. S. Maxey	804 Bennie Dillon Bldg., Nashville 3
Texas			R. T. Weber	312 Capital National Bank Bldg., Austin
Utah			M. W. Merrill	820 N. University Ave., Provo

State	Date	Place	Secretary	Address
Vermont			F. A. Reid	Windsor
Virginia	June 8, 9, 1953‡‡ June 8-12, 1953†	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond 19
Washington	Jan. 12, 1953	Seattle	J. B. Keifer, Jr.	510 Cobb Bldg., Seattle
West Virginia	June 22-24, 1953*	West Liberty	C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin	Jan. 12-16, 1953*	Milwaukee	S. F. Donovan	Tomah
Wyoming			W. A. Hocker	212 O & S Bldg., Casper

*Dentistry and dental hygiene.
**Dental clinical examinations.
†Dental examinations.
††Hygiene clinical examinations.
‡Dental written examinations.
‡‡Hygienists' examinations.
‡‡Dental and dental hygiene written examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
American Academy of Dental Medicine	Dec. 7	New York	W. M. Greenhut Secy.	124 E. 84th St., New York 28
American Academy of Implant Dentures	Feb. 7, 1953	Chicago	P. S. Loechler Secy.	215 Tenth St., S. E., Rochester, Minn.
American Academy of Restorative Dentistry	Feb. 7, 8, 1953	Chicago	A. G. James Secy.	409 N. Camden Drive, Beverly Hills, Calif.
American Association of Dental Schools	Mar. 23-25, 1953	Philadelphia	M. W. McCrea Secy.	Baltimore College of Dental Surgery, Dental School, University of Maryland, Baltimore 1
American Association of Endodontists	Feb. 7, 8, 1953	Chicago	V. B. Milas Secy.	2559 W. 63rd St. Chicago 29
American Association of Orthodontists	Apr. 26-30, 1953	Dallas, Texas	F. A. Squires Secy.	Medical Centre, White Plains, N. Y.
American Board of Orthodontics	Apr. 22-26, 1953	Dallas, Texas	C. E. Martinek Secy.	661 Fisher Bldg., Detroit 2
American Board of Prosthodontics	Feb. 1-7, 1953	Indianapolis	I. R. Hardy Secy.	Tufts College Dental School, 136 Harrison Ave., Boston 11
American Denture Society	Feb. 7, 8, 1953	Chicago	A. L. Roberts Secy.	Aurora National Bank Bldg., Aurora, Ill.
Chicago Dental Society	Feb. 8-11, 1953	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago 2
Council on Dental Education, Dental Aptitude Tests	Mar. 6; 7, 1953		S. Peterson Secy.	222 E. Superior St., Chicago 11
Dallas Mid-Winter Dental Clinic	Jan. 25-28, 1953	Dallas, Texas	W.C.McCaskill, Jr., Gen. Chm.	1329 Medical Arts Bldg., Dallas, Texas.
Denver Dental Association	Jan. 11-14, 1953	Denver	H. L. Harris Secy.	724 Republic Bldg., Denver 2
Greater New York Dental Meeting	Dec. 8-12	New York	A. E. Corby Chm.	Hotel Statler, Room 106A, New York
Greater Philadelphia	Feb. 4-6, 1953	Philadelphia	R. Adams Secy.	Bellevue-Straford Hotel, Suite 337, Broad and Walnut Sts., Philadelphia 2
International Association for Dental Research	Mar. 20-22, 1953	Philadelphia	E. H. Hatton Secy.	311 E. Chicago Ave., Chicago 11
National Board of Dental Examiners	Dec. 1, 2		S. Peterson Secy.	222 E. Superior St., Chicago 11
Pan American Odontological Association	Dec. 10	New York	R. H. Brodsky Acting Exec. Secy.	14 E. 81st St., New York 5
Seattle District Dental Society	Feb. 14, 1953	Seattle	R. J. Wallace Secy.	715 General Insurance Bldg., Seattle 5
Southeastern Society of Oral Surgeons	Mar. 6, 7, 1953	Birmingham, Ala.	C. F. Landeis Secy.	316 James Bldg., Chattanooga, Tenn.
Southern Academy of Oral Surgery	Mar. 21, 22, 1953	Atlanta, Ga.	R. F. Sullivan Secy.	118 E. Jones St., Savannah, Ga.

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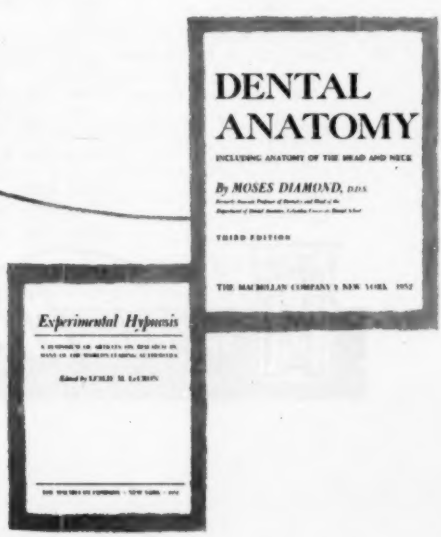

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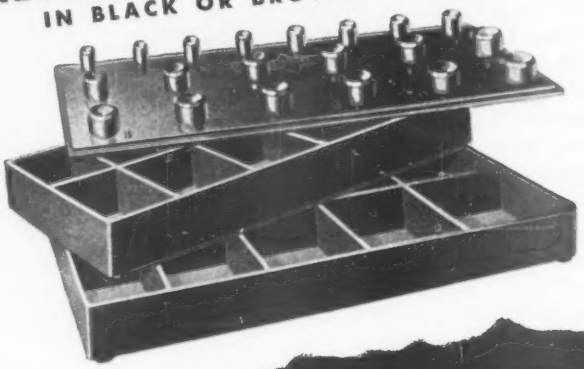

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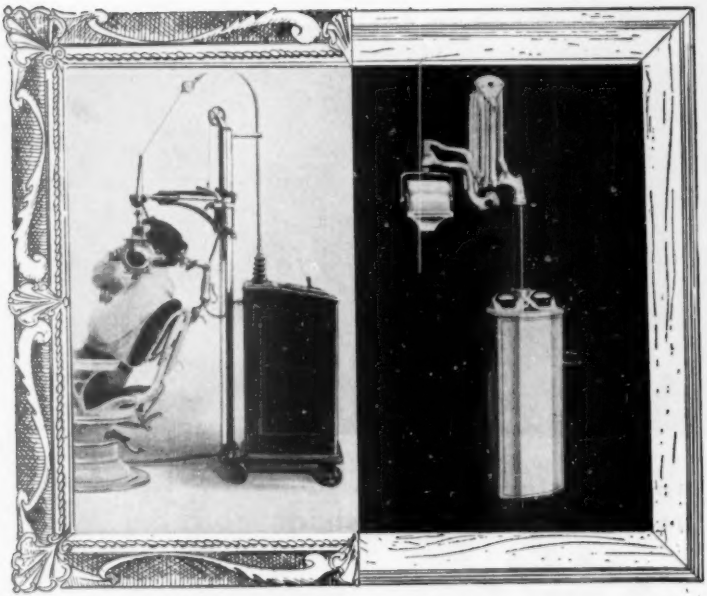

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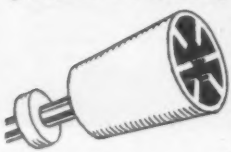

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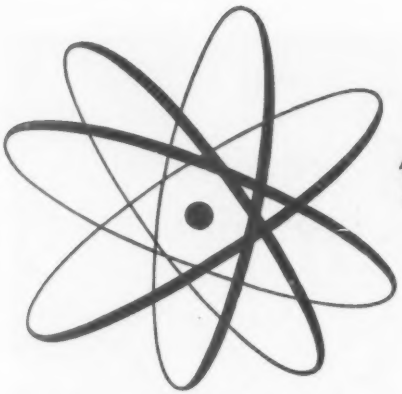

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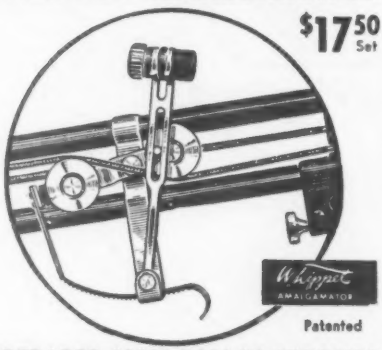

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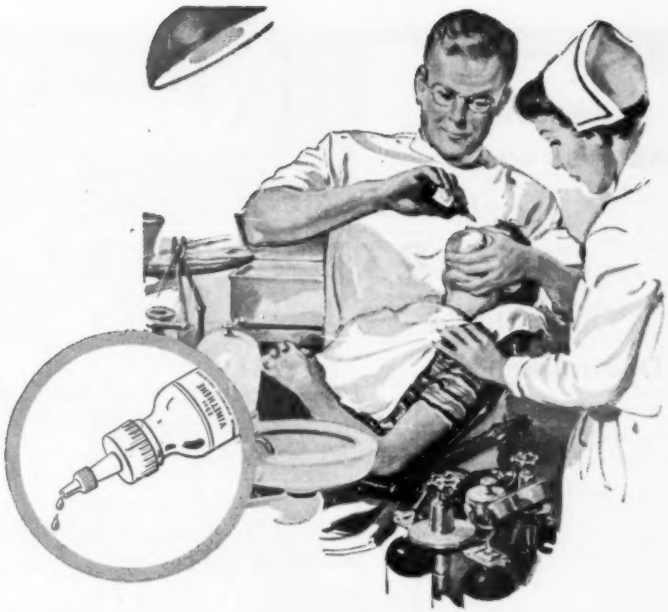

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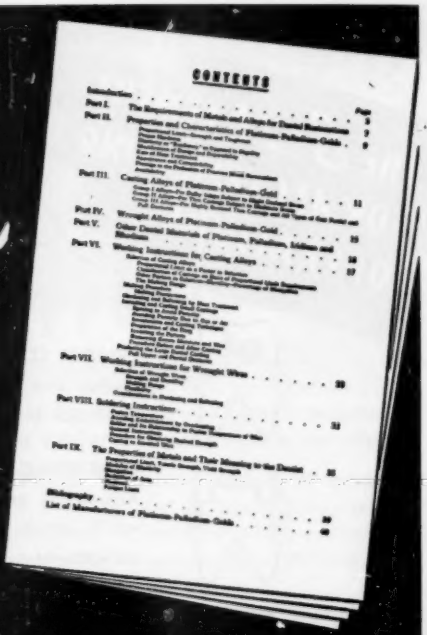

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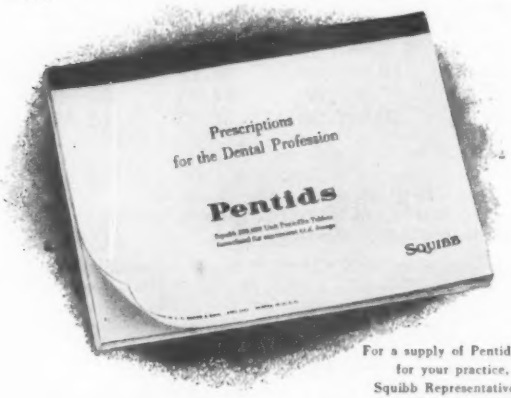
1. Keefer, C. S., Postgrad. Med. 9:101, Feb. 1951
2. Flippin, H. F., and Israel, H. L., Med. Clin. North Amer. 34:1653, Nov. 1950



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With its new germicidal ingredient—INTHOL—Polident now sanitizes, deodorizes and cleans artificial dentures more thoroughly than ever—assures "denture freshness" day after day.

1. **GERMICIDAL:** Inthol has quick, positive germicidal action, yet is completely safe for patients and dentures.
2. **DEODORANT:** Inthol—odorless itself—neutralizes and eliminates all odors.
3. **CLEANSING:** Inthol enhances cleaning action—assures more active penetration to all denture surfaces and interstices.

OTHER METHODS CAN'T DO IT!
ONLY POLIDENT WITH INTHOL CAN!

Ordinary cleansing agents fail to provide positive germicidal action against salivary organisms. Only Polident with Inthol can, as proved by laboratory tests.

Germicidal Action Proved By Laboratory Tests

As a test of germicidal action, saliva was mixed with solutions of (1) Polident with Inthol, (2) soap and water, (3) household cleanser and (4) regular dentifrice. Agar plates were streaked with a sample from each mixture and incubated. The photos (left) show that methods 2, 3, and 4 failed to prevent bacterial growth. *Only Polident with Inthol (1) provided positive germicidal action against salivary organisms.*

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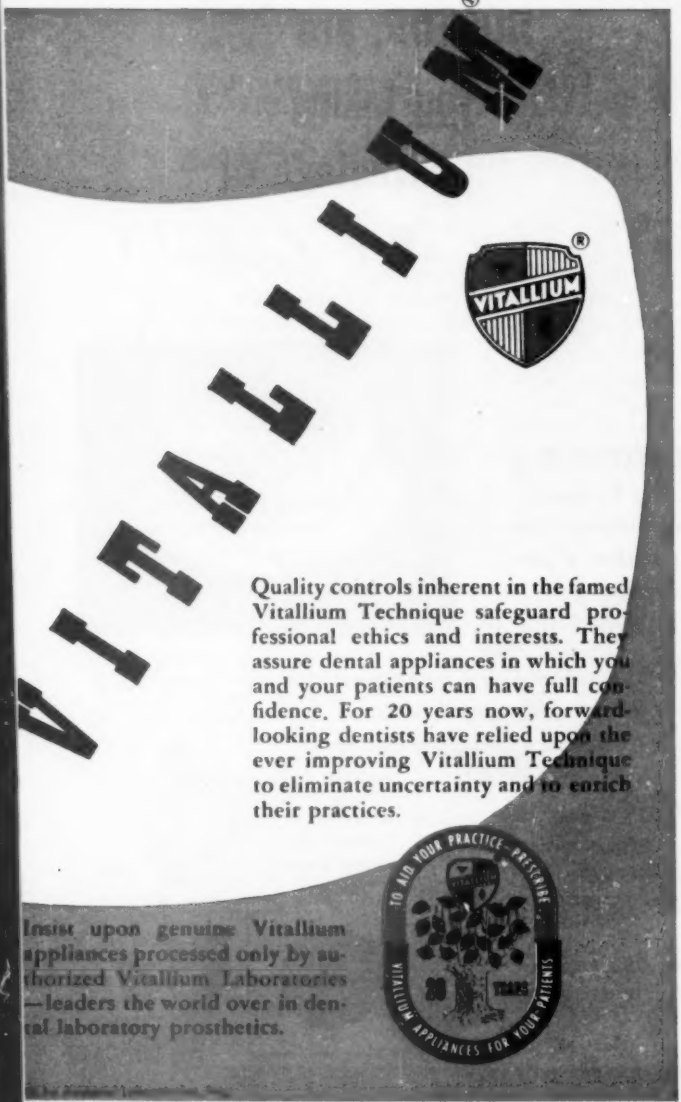
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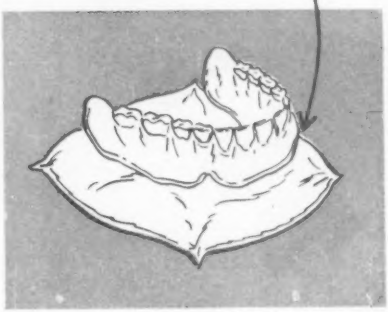

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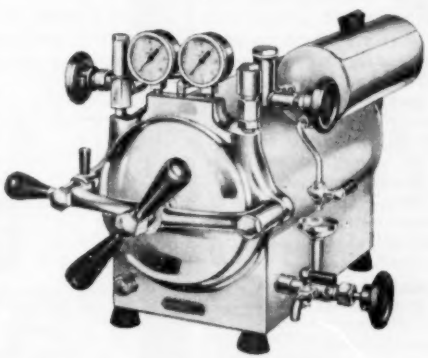
The FL-2 generates and then stores steam under pressure in its outer chamber ready for instant use. That means fast sterilizing. In all-day operation, current is off two-thirds of time. That means economy. One quart of water lasts one to several days without replenishing. Inner chamber is 6″ x 12″. Automatic controls, sturdy construction, lustrous chrome finish.



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No cigarette can contain a filter

this GOOD
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for nicotine and tars!

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The man who made dentistry a part of modern medicine

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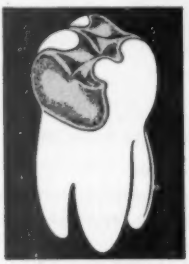
A soft, burnishable, gold-colored alloy for inlays subject to moderate occlusal stress.



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For m.o.d. inlays, ¾ crowns, pontics, posterior abutments, etc. A dependable, light-coin-colored gold for medium hard inlays. Though hard, it is burnishable . . . a desirable characteristic when spinning the margins.

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The Denture Backing itself provides
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supporting an isolated tooth.
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Steele's Denture Backings are supplied
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depth *without* danger

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Monocaine is the registered trade mark of the Novocol Chemical Mfg. Co., Inc.

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Multivitamins

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Formulae

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Niacinamide	6.67 mg.
Ascorbic Acid (C)	10.00 mg.
Calcium Pantothenate	2.00 mg.
Calcium (in $Ca_2P_2O_7$)	153.00 mg.
Iron (in Ferr. Pyrophosph. Sol.)	3.36 mg.
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Excipients, flavoring and artificial coloring

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Each capsule contains:

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Vitamin D (Viosterol)	500 U.S.P. Units
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Riboflavin (B_2)	3 mg.
Pyridoxine HCl (B_6)	0.2 mg.
Ascorbic Acid (C)	75 mg.
Niacinamide	20 mg.
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Vitamin B_{12}-B_{12}	1 microgram

(as present in concentrated extractives from streptomyces fermentation)

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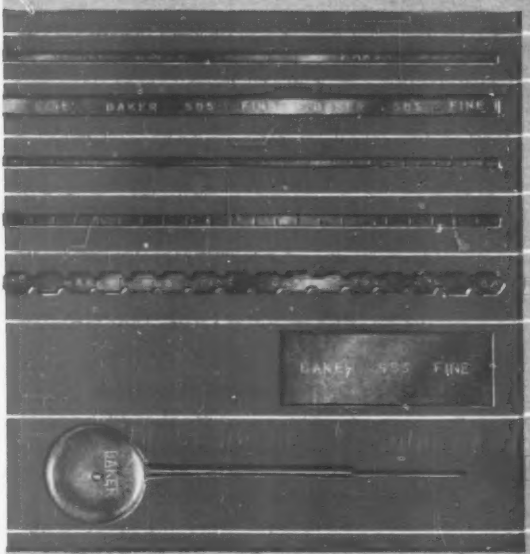

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Surveys indicate the majority of dental schools in the U. S. advocate aspiration.[1] For, as you know, local anesthetics have been shown to be 8 to 15 times more toxic intravenously than intramuscularly.[2]

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This *Self-Aspirating plunger* provides the benefits of aspiration (without danger of tissue damage) with *any cartridge syringe.*

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1. Dental Survey, 25, 969-9, (1949)
2. Gordon, S.: Dental Service and Dental Art, p. 616, Lea & Febiger, (1938)
3. Shotwell, James E., Toxic Effects Following Local Anesthesia: Oral Surg., Oral Med. & Oral Path. 1, 730-5 (1948)

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a permanent bond . . .

amazing resin cement

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will not wash out . . .

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DuraCement is hard, strong, dense. Superior to zinc cements, it forms a permanent, mechanical bond that will not wash out, crumble or disintegrate.

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DuraCement forms a lasting seal between tooth enamel or dentine, and gold, porcelain or acrylic on jacket crowns, bridges, inlays, facings. It is non-irritating to nerve, pulp or tissue; unaffected by heat, cold, or mouth fluids.

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jacket crowns, inlays, bridges

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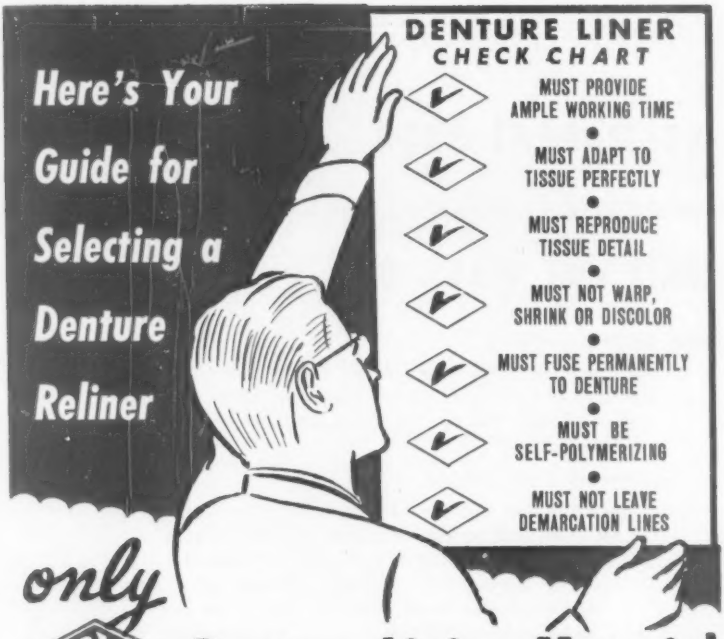
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MUST ADAPT TO TISSUE PERFECTLY
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Now . . . a new ALL-PURPOSE economy package of ORYL Denture Lining and Repair Material. Comes in a compact kit containing 2 ounces of *BOTH* CLEAR and PINK material (enough for 25 to 30 complete relines), 3 ounces of liquid, 2 measuring cups and a mixing jar . . . all ready for ANY denture rebase or repair. The same easy-to-use, fast, one-visit top QUALITY material now used by thousands of dentists and laboratories with complete patient satisfaction. Made by a pioneer producer of lining materials. Get this new *low cost, all-purpose* DUO-KIT now.

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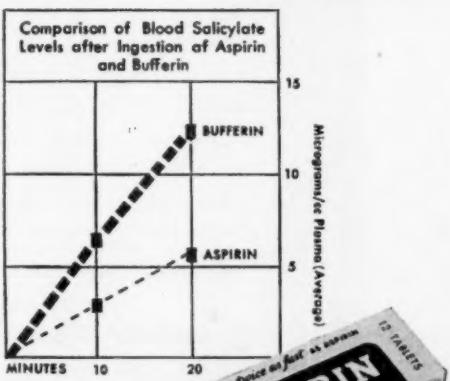
Doctor, I have a toothache!

When dental pain strikes, the patient thinks first of you. At midnight or 6 A.M., or in the midst of a busy day, your patient expects you to do something for her—immediately.

For *faster pain relief* recommend BUFFERIN, the antacid analgesic, which *acts twice as fast as aspirin.* Within 10 minutes after BUFFERIN is taken, the blood salicylate levels are higher than those attained by aspirin in twice this time.

BUFFERIN is antacid, too. Whether given in small or large doses, BUFFERIN rarely produces gastric distress.

Use BUFFERIN before and after extractions and along with other therapy to minimize discomfort.



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ACTS TWICE AS FAST AS ASPIRIN
DOES NOT UPSET THE STOMACH

BUFFERIN is a trade mark of the BRISTOL-MYERS CO., 19 W. 50 St., New York 20, N.Y.

The novice bicycle rider may be "riding for a fall" unless he uses the handle bars. And the novice denture wearer often finds it wise also to use every facility available to enable him to increase his expertness in manipulating the new denture.

The soft, resilient cushion provided by Wernet's Powder reduces discomfort . . . improves retention and stability . . . helps eliminate awkwardness . . . builds up self-confidence. In cases of structural abnormalities Wernet's Powder helps compensate for the anatomical difficulties and promotes greater usefulness of the denture and greater comfort. Such patients appreciate both the dentist's skill in designing a perfectly fitting denture and his recommendation of Wernet's Powder to minimize their handicaps.

WERNET DENTAL MFG. CO., INC., JERSEY CITY 2, N. J.

Speeds the Mastery of the Denture

WERNET'S POWDER

WERNET DENTAL LORE

DEC. 1952

Children do well to watch that toothbrush! Of all the teeth lost between the ages of 10 and 35, about 87% are the victims of teen-age caries.

• • •

Could Washington Irving have had his versatile tongue in cheek when he said: "God bless those Surgeons and Dentists! May their good deeds be returned upon them a thousandfold. May they have the felicity in the next world to have successful operations performed upon them through all eternity."

• • •

The Philadelphia physician Samuel S. Fitch performed a Herculean labor of love for the sister profession, dentistry, when in 1829 he published his "System of Dental Surgery," a remarkable compilation of all valuable dental literature known to that date. And a 2nd edition of this work (1835) reviewed the history of dentistry as published in 7 languages!

• • •

J. B. Beers introduced (and patented) the gold shell crown in the U.S. in 1873, about 125 years after a Frenchman, Pierre Mouton of Paris, published an account of how such a crown could be made.

• • •

Orthodontists might well appoint Dr. Edward H. Angle as their patron saint, since his efforts so largely sparked the rapid advance of orthodontics as an established specialty—from the 12 Americans specializing in this field at the turn of the century, to the 1700 in the U.S. and the world today. This growth saw also the founding of 14 orthodontic societies in this country, and 9 abroad.

• • •

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(1) Berk, H., J. Dent. for Child., 17:65 (4th quarter) 1950.

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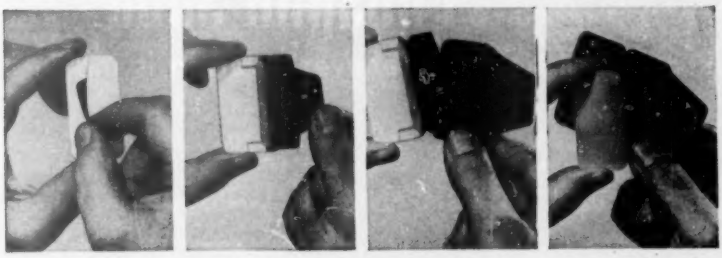

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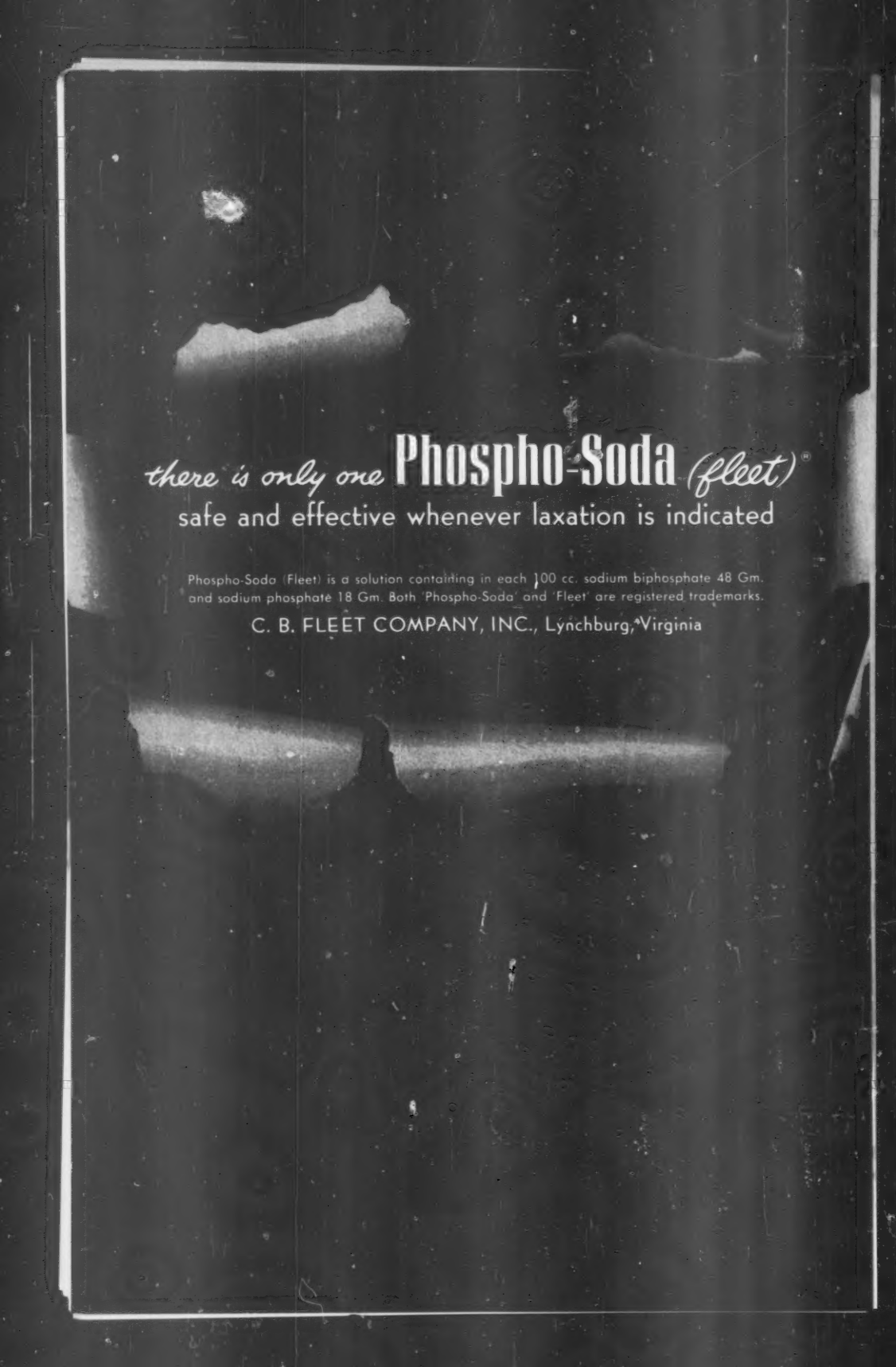
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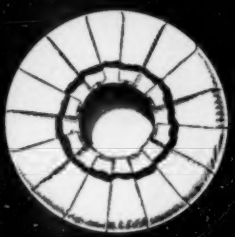

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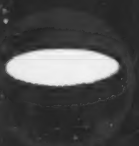

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